2ARelays
Induction
Non-Mag
Rotor
1

Section N, Part 1

Model 2A Alternating-Current Relays Induction, Non-Magnetic Rotor Type

PLATE N0101

GENERAL RAILWAY SIGNAL COMPANY April 1917

Model 2A and Model 2B Relays

Important Notice

When ordering always give the following information, or as much of it as possible.

Track Relays

Rail	Give size and section of rail.
Bonding	For steam roads, state size, kind and number of bond wires per joint. For electric roads, state if both rails are power bonded. If not, give bonding for each rail.
Ballast	State kind—stone, gravel or cinders. State whether or not ballast is free from base of rails. State if ballast is drained.
Length of Track Circuits	State maximum, minimum and average length of track circuits.
Type of Track Circuits	State whether track circuits are: (1) Steam road. (2) Electric Traction d-c. propulsion, single rail or double rail. (3) Electric Traction a-c. propulsion, single rail or double rail.
Signaling Current	State frequency of signaling current and give voltage available for local phase of Relay. 55 volts and 14 volts 25 cycle or 110 volts and 27½ volts 60 cycle windings are standard for track relays.
Electric Road a-c. or d-c. Propulsion	State the following: a—Whether one or two rails are used for return propulsion current. Note: With two rail track circuits it is necessary to employ impedance bonds to provide a continuous return for the propulsion current around the insulated joints in each rail at the ends of track sections. With single track rail circuits no impedance bonds are required. It is not advisable, from a traction standpoint, however, to use, single rail track circuits except at such points where there are several parallel tracks where the electrically continuous rails may be cross bonded thereby providing a propulsion return in case the bonding in the power rail of one track becomes defective. Care should be exercised to avoid the use of single rail track circuits of too great a length. One thousand feet may be taken as an approximate maximum length. If it is desired to operate single rail track circuits longer than this, the matter should be taken up with the Signal Company and their recommendations obtained.

Model 2A and Model 2B Relays

Important Notice—Continued

Electric Road a-c. or d-c. Propulsion

b—When two rails are used for return propulsion current, give:

1—Impedance of bonds if they are already installed. Note: It is recommended that the manufacturer of relay should specify the proper impedance of bonds to be used in connection with said relay.

2—Per cent. of unbalanced current. Note: Impedance bonds are ordinarily designed for 20 per cent unbalancing, that is the current in one rail may exceed the current in the other rail by an amount equal to 20 per cent of the sum of the two currents without seriously affecting the impedance of the bond.

c—Maximum and average a-c. or d-c. amperes return propulsion current per rail.

d—Duration of maximum current.

Line Relays

Specifications

Give frequency of signaling current, operating voltage and line resistance State whether relay is to be operated from single circuit or two circuits. If operated from two circuits, give local and line operating voltages. Standard voltages for line relays are 55 volts 25 cycles and 110 volts 60 cycles. Note: Relays wound for operation from two circuits will also operate from a single circuit source, providing the local and line operating voltages are the same, the phase displacement being secured in the windings of the relay. Ordinarily two position relays are wound for single circuit operation. Three position relays are always wound for two circuit operation.

Note: The Model 2B Relays as shown in Part 2 of this Section are recommended for use where a line relay is required. The Model 2A Relays as shown in Part 1 of this Section are used as line relays, however, where special conditions exist or where the contact capacity of the Model 2B is not sufficient to meet requirements.

PLATE NO103

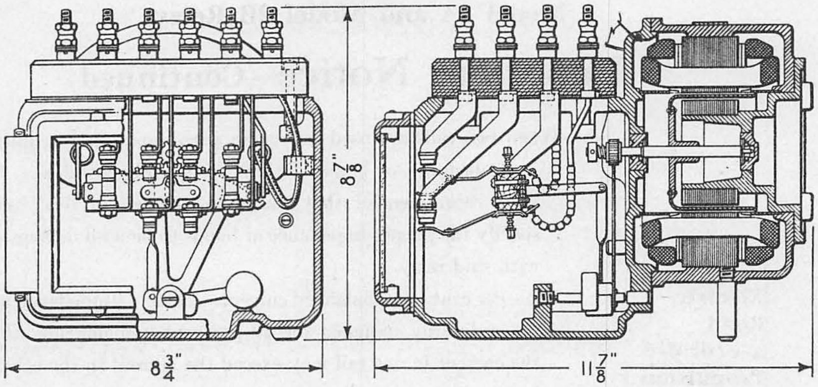
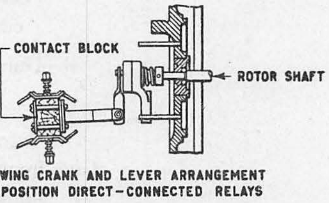
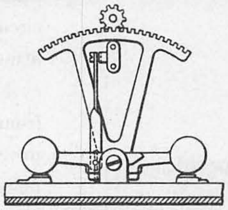

8 7/8"
8 3/4"
11 7/8"

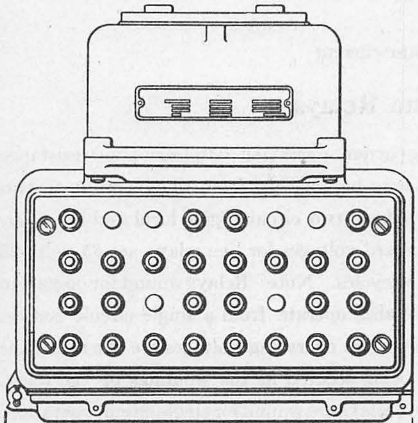
Fig. A7
Model 2A Relay—Four Way


CONTACT BLOCK
ROTOR SHAFT

VIEW SHOWING CRANK AND LEVER ARRANGEMENT FOR TWO POSITION DIRECT-CONNECTED RELAYS



VIEW SHOWING SECTOR AND PINION ARRANGEMENT FOR THREE POSITION RELAYS



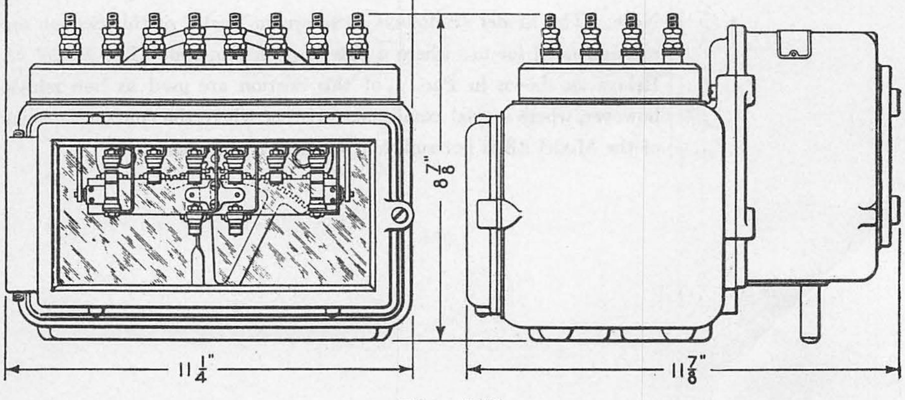

8 7/8"
11 1/4"
11 7/8"

Fig. A12
Model 2A Relay—Six Way

Model 2A Alternating-Current

Relays

Four and Six Way, Two and Three Position

Note: When ordering relays complete always give information requested on Plate N0101.

Model 2A Relays as illustrated on opposite page are designed principally for use as track relays on Steam Roads or Electric Traction Lines employing direct-current for propulsion. They are, however, used as line relays where special conditions exist or where the contact capacity of the Model 2B relays shown on Plate N0201 is not sufficient to meet requirements.

When ordering two position relays specify whether regular or direct-connected relay is required. Direct-connected relays are arranged with a crank and lever directly connected to the rotor for operating the contact fingers, as shown in sub-assembly. This provides for a quicker pick up and drop away but requires more energy for equal contacting power than the regular relays which have a pinion and sector arrangement for operating the contact fingers. Relays complete on opposite page are shown as two position regular relays. Three position relays are always furnished with regular pinion and sector arrangement as shown in sub-assembly.

If relay is to be used in connection with single rail track circuits on Electric Traction Lines using direct-current for propulsion, one Balancing Impedance as shown on Plate N1313 of this Section should be ordered separately for each relay.

Relays are furnished with silver to graphite contacts. Binding posts are R. S. A. Standard No. 14-24 threads.

If de-energized contact for three position relay or magnetic blowout for two position six way relay and if binding posts, contacts or contact combination other than those listed is desired same must be specified. See Plates N0113 and N0115 for de-energized contact, contact groups and contact parts.

The contact housings for the four and six way relays will accomodate a maximum of eight and twelve contact fingers respectively, these controlling eight or twelve independent circuits.

When it is desired to duplicate a relay or when ordering repair parts always refer to name plate of relay in question and give drawing number and other data shown thereon.

See Plate N0107 for Model 2A Indicating Relays.

Continued on following page

PLATE NO103

GENERAL RAILWAY SIGNAL COMPANY April 1917

Model 2A Alternating-Current
Relays
Four and Six Way, Two and Three Position

Order by plate, figure number and name

Model 2A Relays—Two Position

Fig. No.	CONTACTS			4 or 6 way case	Drawing Reference
	Independent		Dependent		
	Front	Back	Front and Back		
A	2	0		4	
A 1	2	2		4	
A 2	2		2	4	
A 3	2	4		4	
A 4	2	6		6	
A 5	4	0		4	
A 6	4	2		4	
A 7	4		2	4	
A 8	4	4		4	
A 9			4	4	
A10	4	6		6	
A11	6	0		4	
A12	6		2	6	
A13	6	2	2	6	
A14	6	4		6	
A15	6	6		6	
A16			6	6	
A17	8	0		4	
A18	8	2		6	
A19	8		2	6	
A20	8	4		6	
A21	10	0		6	
A22	10	2		6	
A23	10		2	6	
A24	12	0		6	

Model 2A Alternating-Current
Relays
Four and Six Way, Two and Three Position

Order by plate, figure number and name

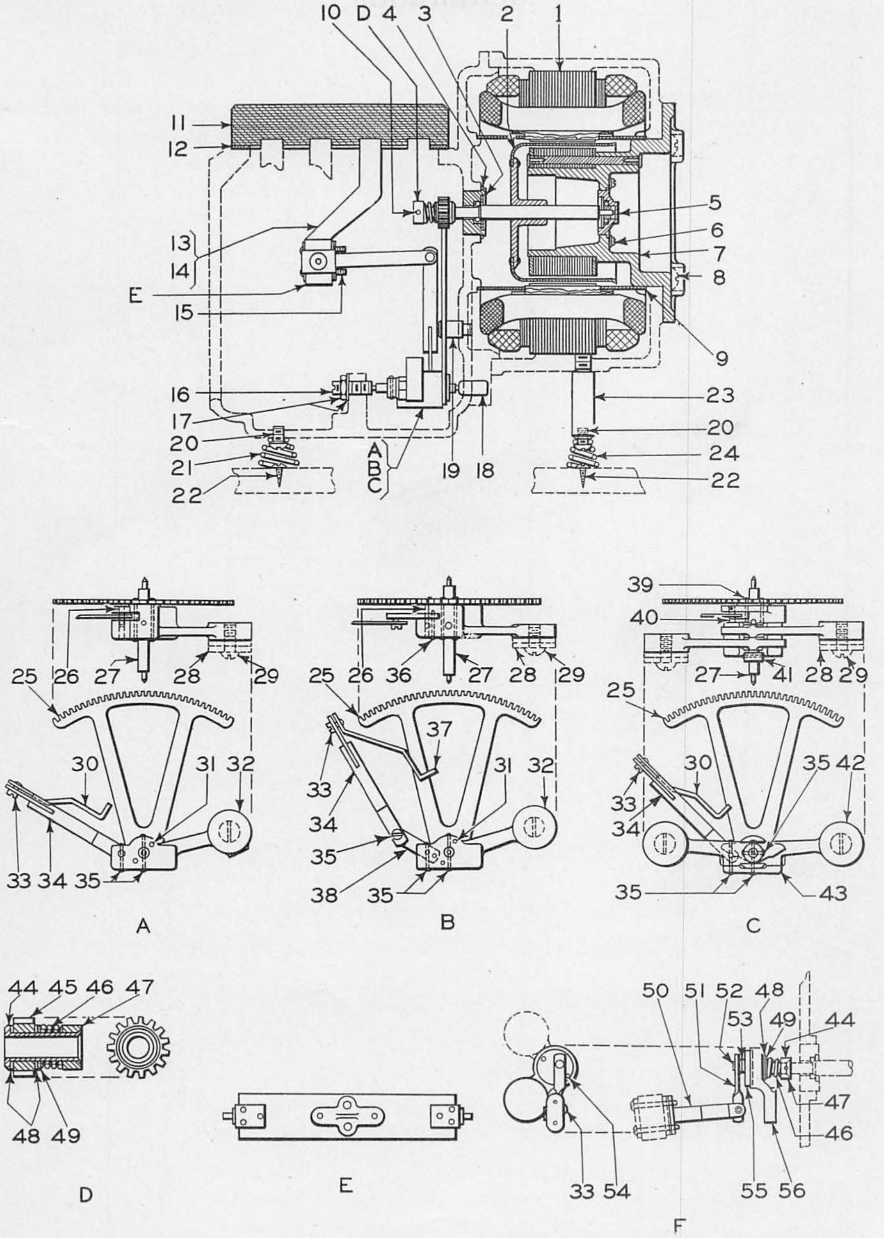
Model 2A Relays—Three Position

Fig. No.	CONTACTS			4 or 6 way case	Drawing Reference
	Independent		Dependent		
	Normal	Reverse	Normal and Reverse		
B	2	0		4	
B 1	2	2		4	
B 2	2		2	4	
B 3	2	4		4	
B 4	2	6		6	
B 5	4	0		4	
B 6	4	2		4	
B 7	4		2	4	
B 8	4	4		4	
B 9			4	4	
B10	4	6		6	
B11	6	0		4	
B12	6		2	6	
B13	6	2	2	6	
B14	6	4		6	
B15	6	6		6	
B16			6	6	
B17	8	0		4	
B18	8	2		6	
B19	8		2	6	
B20	8	4		6	
B21	10	0		6	
B22	10	2		6	
B23	10		2	6	
B24	12	0		6	

Memoranda

Memoranda

PLATE N0104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25 26 36 27 28 29
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A
B
C
44 45 46 47
48 49
D
E
50 51 52 48
53 49 44
47
46
33 54
55 56
F

Detail Parts for Model 2A Two and Three-Position Relays

Model 2A Alternating Current Relays
Four and Six-Way, Two and Three-Position

Detail Parts

Note: The details shown on this plate are for the relays shown on Plate N0103. The parts listed below are chiefly moving and electrical parts. Contact groups are shown on Plates N0114 and N0116.

When ordering sectors, rotors, stators, etc., refer to name plate of relay for which parts are required and give drawing number and other data shown thereon.

Drawing references are shown for convenience in checking shipping lists and invoices.

Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
A	Sector Complete, as shown, for regular, two-position, pinion and sector connected relay. Specify number of washers required on counterweight. Give data shown on name plate of relay	39924
B	Sector Complete, as shown, for quick-acting, two-position, pinion and sector connected relay. Specify number of washers required on counterweight. Give data shown on name plate of relay	39924-3
C	Sector Complete, as shown, for regular, three-position, pinion and sector connected relay. Specify number of washers required on counterweights. Give data shown on name plate of relay	39924-2
D	Pinion Complete, as shown, for rotor shaft on pinion and sector connected relays	36187 Gr 1
E	Contact Bar Complete, for four-way relays	39917 Gr 5
E1	as above, except for six-way relays	39917 Gr 6
F	Link Complete, for direct connected relays. Includes all parts used to operate contact bar from rotor shaft	46270 Gr 1
1	Stator Complete. Give data shown on name plate of relay	41610
2	Rotor Complete. Give data shown on name plate of relay	36125
3	Ball Bearing Complete, front, for rotor shaft	35532 Gr 1
4	Shim Washer, .010″ thick, for bearing, Fig. 3. Used to regulate end play of rotor shaft	49772
5	Ball Bearing Complete, rear, for rotor shaft	37419 Gr 1
6	Screw, No. 6-32 x 3/16″ rd. hd., for fastening bearing Fig. 5 to core Fig. 7. Includes lock washer	2613-4 53029-1

PLATE NO104

Model 2A Alternating Current Relays
Four and Six-Way, Two and Three-Position

Detail Parts

Drawing references are shown for convenience in checking shipping lists and invoices.

Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
7	Core Complete. Give data shown on name plate of relay	41582 Gr 1
8	Screw, No. 14—24 x $\frac{3}{8}''$ rd. hd. for fastening core Fig. 7 to case.	40114-1
9	Shield, as shown. Two required	41536
10	Taper Pin, No. 000 special, for fastening pinion Fig. D and collar Fig. 47 to rotor shaft	34891
11	Terminal Block only, for four-way relays	42951
11a	as above, except for six-way relays	42950
12	Gasket, for terminal block, Fig. 11, for four-way relays	13014-9
12a	as above, except for terminal block, Fig. 11a, for six-way relays	13014-10
13	Bracket, left hand, for contact bar	40617
14	Bracket, right hand, for contact bar	40618
15	Screw, No. 8—32 x 1″ rd. hd. for fastening contact bar to lever	2553-1
16	Bearing Screw, for sector shaft for pinion and sector connected relays	43346-2
17	Nut, $\frac{5}{16}''$—24 hex., for bearing screw, Fig. 16. Includes shakeproof lock-washer	43337-1 53029-5
18	Bearing, for sector shaft for pinion and sector connected relays	34464-1
19	Stud, used as stop for sector on pinion and sector connected relays	41588
19a	as above, except stop for counterweight on direct connected relays	6890-1
20	Screw, No. 14—24 rd. hd. for mounting springs, Figs. 21 and 24	50595-5
21	Spring, short, for use under contact case	51055-2
22	Screw, No. 10 x $\frac{1}{2}''$ rd. hd. wd., for use under springs	
23	Stud, for stator case. Does not have tapped hole for mounting spring	34486
23a	as above, except has tapped hole for mounting spring	34486-1
24	Spring, long, for use under stator case	51055-3
25	Sector, only, for Figs. A, B and C	36186
26	Pin, $\frac{5}{32}''$ x $\frac{9}{16}''$ for fastening link, Fig. 34 to counterweight in Figs. A and B	35442

Model 2A Alternating Current Relays
Four and Six-Way, Two and Three-Position

Detail Parts

Drawing references are shown for convenience in checking shipping lists and invoices.

Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
27	Shaft, for counterweight	34446
28	Washer, for counterweight	39823
29	Screw, No. 14—24 for fastening one washer to counterweight	50595-4
29a	as above, except for two washiers	50595-3
29b	same as Fig. 29, except for three or four washers	50385-1
29c	same as Fig. 29, except for five or six washers	50872-1
29d	same as Fig. 29, except for seven or eight washers	48563-1
29e	same as Fig. 29, except for nine washers	4303-2
30	Lever, for operating contact bar, for Figs. A and C	34439
31	Escutcheon Pin, No. 14 x 1″, for fastening sector to counterweight in Figs. A and B	41839
32	Counterweight, only, for Figs. A and B	42556
33	Screw, for fastening levers to links	34412
34	Link Complete, insulating, for operating lever	40451
35	Escutcheon Pin, No. 16 x $\frac{7}{8}$″ for fastening pin and shaft to counterweight	28985
36	Escutcheon Pin, No. 16 x $\frac{5}{8}$″ for fastening lever Fig. 38 to counterweight	17908
37	Lever, for operating contact bar, for Fig. B	42589
38	Lever, for link, Fig. 34 in Fig. B	42588
39	Escutcheon Pin, No. 14 x $\frac{3}{4}$″, for fastening sector to support Fig. 43 in Fig. C	28986
40	Pin, $\frac{5}{32}$″ x $\frac{7}{16}$″, for fastening link Fig. 34 to support Fig. 43 in Fig. C	42526
41	Collar, for shaft	34453
42	Counterweight, for Fig. C. Two required	41589
43	Support, for sector	41590
44	Sleeve, for rotor shaft	37566
45	Pinion, only	36188
46	Spring, as shown	34438
47	Collar, for sleeve	34452
48	Washer, fibre	34455

PLATE N0104

Model 2A Alternating Current Relays
Four and Six-Way, Two and Three-Position

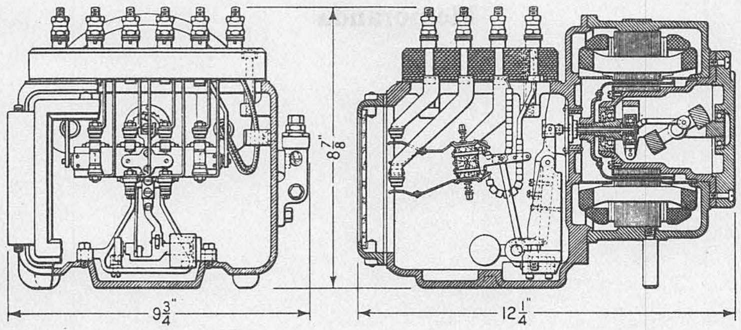
Detail Parts

Drawing references are shown for convenience in checking shipping lists and invoices.

Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
49	Washer, for spring	34454
50	Lever, for operating contact bar	46273
51	Link, for lever, Fig. 50	46274
52	Stud, for fastening link, Fig. 51 to counterweight	46275
53	Washer, for stud, Fig. 52	15636-1
54	Escutcheon Pin, No. 14 x ¾″ for fastening cap, Fig. 55 to counterweight	40799
55	Cap, for counterweight	46271
56	Counterweight, only, as shown	46272

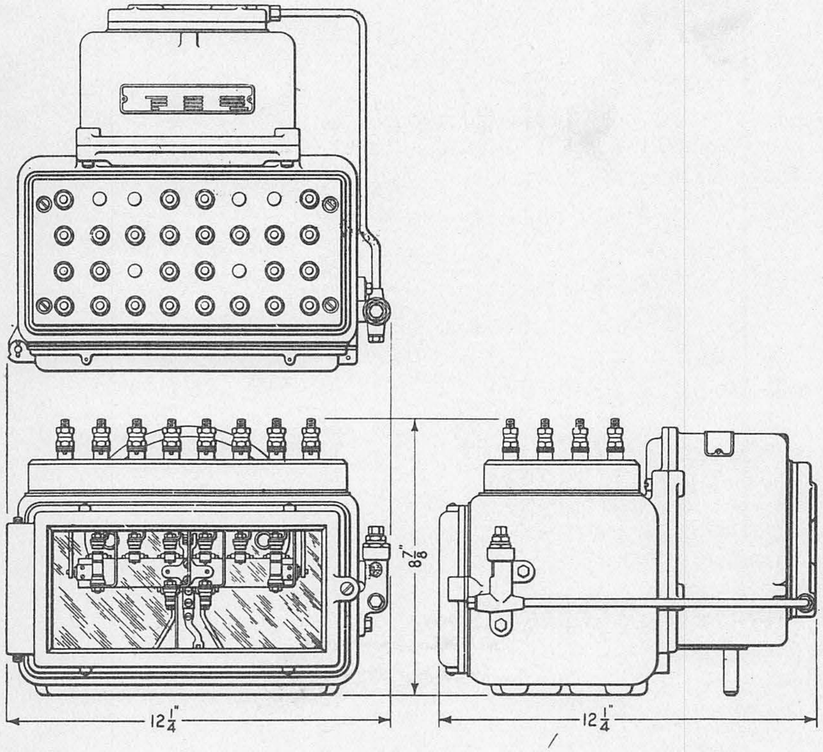
Memoranda

PLATE NO105



$8\frac{7}{8}''$
$9\frac{3}{4}''$
$12\frac{1}{4}''$

Fig. A7
Model 2A Centrifugal Frequency Relay—Four Way



$8\frac{7}{8}''$
$12\frac{1}{4}''$
$12\frac{1}{4}''$

Fig. A12
Model 2A Centrifugal Frequency Relay—Six Way

Model 2A Alternating-Current

Centrifugal Frequency Relays

Four and Six Way, Two Position

Note: When ordering relays complete always give information requested on Plate N0101.

Model 2A Centrifugal Frequency Relays as illustrated on opposite page are designed principally for use as track relays for two rail track circuits on Electric Traction Lines employing alternating-current for propulsion. They are, however, used on short one rail track circuits or as line relays. They are used on Steam Roads only at crossings with Electric Lines employing alternating-current for propulsion.

In these relays, when the track section is unoccupied by a train, the rotor operates at a speed proportional to the frequency of the signaling current. When running at such speed the rotor operates a centrifuge which in turn operates the contacts through the medium of the contact bar which is suitably connected to the centrifuge. If the track section is occupied or the rotor is running at a speed lower than that corresponding to the signaling frequency the centrifuge will not operate and, therefore, movement can not be transmitted to the contacts. This prevents operation by the lower frequency propulsion current. Relay rotors will only operate in one direction, thus giving broken joint protection when adjacent track feeds have staggered polarities.

Relays are furnished with silver to graphite contacts. Binding posts are R. S. A. Standard No. 14–24 threads.

If binding posts, contacts or contact combination other than those listed is desired same must be specified. See Plates N0113 and N0115 for contact groups and contact parts. The contact housings for the four and six way relays will accommodate eight and twelve contact fingers respectively, these controlling eight or twelve independent circuits.

When it is desired to duplicate a centrifugal frequency relay or when ordering repair parts always refer to name plate of relay in question and give drawing number and other data shown thereon.

See Plate N0107 for Model 2A Indicating Relays.

Continued on following page

GENERAL RAILWAY SIGNAL COMPANY April 1917

Model 2A Alternating-Current
Centrifugal Frequency Relays
Four and Six Way, Two Position

Order by plate, figure number and name

Model 2A Centrifugal Frequency Relays—Two Position

Fig. No.	CONTACTS			4 or 6 way case	Drawing Reference
	Independent		Dependent		
	Front	Back	Front and Back		
A	2	0		4	
A 1	2	2		4	
A 2	2		2	4	
A 3	2	4		4	
A 4	2	6		6	
A 5	4	0		4	
A 6	4	2		4	
A 7	4		2	4	
A 8	4	4		4	
A 9			4	4	
A10	4	6		6	
A11	6	0		4	
A12	6		2	6	
A13	6	2	2	6	
A14	6	4		6	
A15	6	6		6	
A16			6	6	
A17	8	0		4	
A18	8	2		6	
A19	8		2	6	
A20	8	4		6	
A21	10	0		6	
A22	10	2		6	
A23	10		2	6	
A24	12	0		6	

Memoranda

PLATE NO107

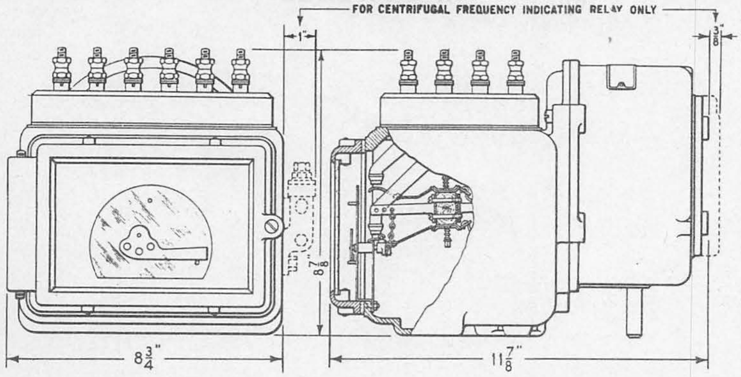

FOR CENTRIFUGAL FREQUENCY INDICATING RELAY ONLY
1"
3/8"
8 7/8"
8 3/4"
11 7/8"

Fig. A6—Model 2A Indicating Relay—Four Way
Fig. B6—Model 2A Centrifugal Frequency Ind. Relay—Four Way

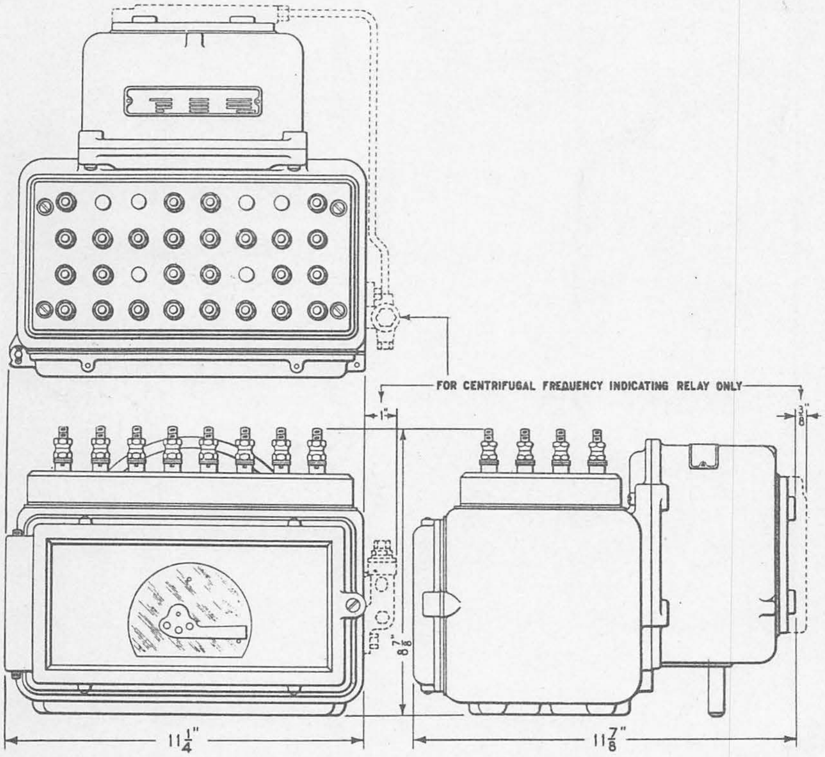

FOR CENTRIFUGAL FREQUENCY INDICATING RELAY ONLY
1"
3/8"
8 7/8"
11 1/4"
11 7/8"

Fig. A10—Model 2A Indicating Relay—Six Way
Fig. B10—Model 2A Centrifugal Frequency Ind. Relay—Six Way

Model 2A Alternating Current

Indicating Relays

Four and Six Way, Two Position

Note: When ordering indicating relays complete always give information requested on Plate N0101.

The Model 2A two position Relays as shown on Plate N0103 and Centrifugal Frequency Relay shown on Plate N0105 may be equipped with indicating attachment as shown on opposite page. This is practicable at Interlockings on Steam Roads or on Electric Roads employing single rail track circuits when it is desired to locate the relay in the tower a long distance from its point of connection to the rails. Where two rail track circuits with impedance bonds are employed, it is not advisable to locate the relay in the tower unless the point of connection to the rails is within a short distance of same.

See Plate N0117 and specify blade required. Also specify color and striping of blade, degrees of movement and position of blade when relay is de-energized.

For further order information and specifications see Plate N0103 for Model 2A Indicating Relay and Plate N0105 for Model 2A Centrifugal Frequency Indicating Relay.

When it is desired to duplicate an indicating relay or when ordering repair parts always refer to name plate on relay in question and give drawing number and other data shown thereon.

Continued on following page

PLATE NO107

Model 2A Alternating-Current

Indicating Relays

Four and Six Way, Two Position

Order by plate, figure number and name

Model 2A Indicating Relays—Two Position

Fig. No.	CONTACTS			4 or 6 way case	Drawing Reference
	Independent		Dependent		
	Front	Back	Front and Back		
A	2	0		4	
A 1	2	2		4	
A 2	2		2	4	
A 3	2	4		6	
A 4	4	0		4	
A 5	4	2		4	
A 6	4		2	4	
A 7	4	4		6	
A 8			4	4	
A 9	6	0		4	
A10	6		2	6	
A11	6	2	2	6	
A12	6	4		6	
A13			6	6	
A14	8	0		6	
A15	8	2		6	
A16	8		2	6	
A17	10	0		6	

Model 2A Alternating-Current

Indicating Relays

Four and Six Way, Two Position

Order by plate, figure number and name

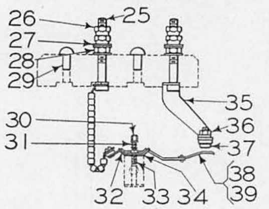
Model 2A Centrifugal Frequency Indicating Relays Two Position

Fig. No.	CONTACTS			4 or 6 way case	Drawing Reference
	Independent		Dependent		
	Front	Back	Front and Back		
B	2	0		4	
B 1	2	2		4	
B 2	2		2	4	
B 3	2	4		6	
B 4	4	0		4	
B 5	4	2		4	
B 6	4		2	4	
B 7	4	4		6	
B 8			4	4	
B 9	6	0		4	
B10	6		2	6	
B11	6	2	2	6	
B12	6	4		6	
B13			6	6	
B14	8	0		6	
B15	8	2		6	
B16	8		2	6	
B17	10	0		6	

Memoranda

Memoranda

PLATE N0114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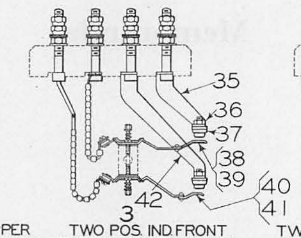
1

TWO POS. INDEPENDENT FRONT UPPER
THREE POS INDEPENDENT NORMAL UPPER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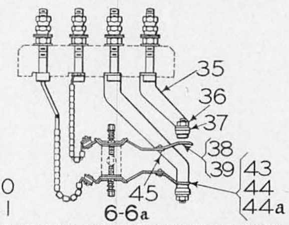
3

TWO POS. IND. FRONT
THREE POS. IND. NORMAL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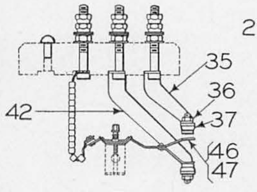
6-6a

TWO POS. IND. FRONT AND IND. BACK
THREE POS. IND. NORMAL AND IND. REVERSE
THREE POS. UPPER IND. NORMAL AND
IND. LOWER DE-ENERGIZED TO REVERSE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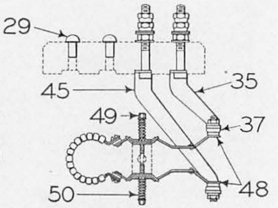
7

TWO POS. DEP. FRONT AND BACK
THREE POS. DEP. NORMAL AND REVERSE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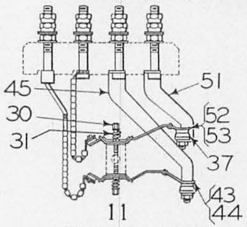
DE-ENERGIZED CONTACT
FOR THREE POS. RELAY ONLY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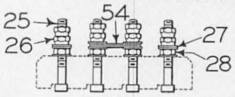
11

TWO POS. IND. BACK
THREE POS. IND. REVERSE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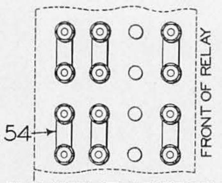
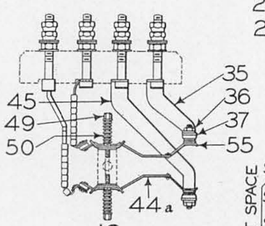
TERMINAL POSTS
FOR STATOR WINDINGS


54
FRONT OF RELAY

PLAN VIEW OF MAGNETIC BLOWOUT
SHOWING BINDING POST
CONNECTIONS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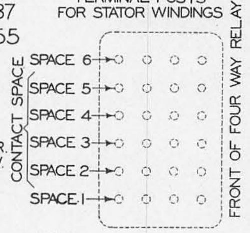
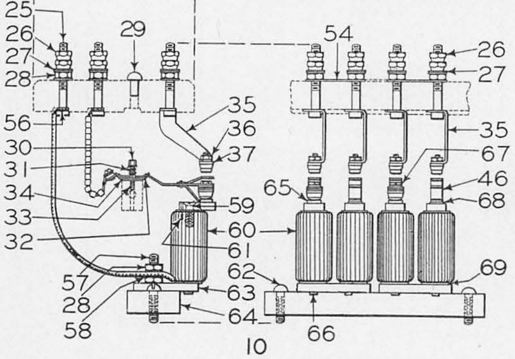
44a

12

IND. UPPER DE-ENERGIZED TO NOR.
IND. LOWER DE-ENERGIZED TO REV.
FOR THREE POSITION RELAY


SPACE 6
SPACE 5
SPACE 4
SPACE 3
SPACE 2
SPACE 1
CONTACT SPACE
FRONT OF FOUR WAY RELAY

ARRANGEMENT OF CONTACT SPACES
FOUR WAY RELAY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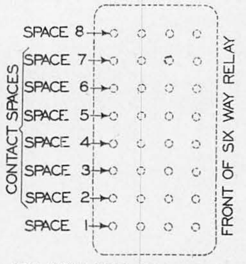
10

CONTACTS COMPLETE WITH MAGNETIC BLOWOUT
SPACES 3, 4, 5 AND 6 ON SIX WAY TWO POS RELAYS ONLY


SPACE 8
SPACE 7
SPACE 6
SPACE 5
SPACE 4
SPACE 3
SPACE 2
SPACE 1
CONTACT SPACES
FRONT OF SIX WAY RELAY

ARRANGEMENT OF CONTACT SPACES
SIX WAY RELAY

Contact Groups for Model 2A Relays
Silver to Carbon Contacts

Contact Groups

For Model 2A Relays
Silver to Carbon Contacts

Note: Binding posts for all contact groups listed below have A. R. A. standard No. 14-24 threads. Relays have been furnished with binding posts with ¼″-24 threads which must be specified if desired.

When ordering contact groups always specify whether desired for two or three-position relays. If special contact adjustment is desired same must be specified.

Contact groups as listed below are furnished with silver to carbon contacts with the exception of group 10 which has four silver to carbon front contacts, two silver to silver and two carbon to carbon back contacts.

Contact groups are designated: front and back for two-position relays (Fig. A); normal and reverse for three-position relays (Fig. B).

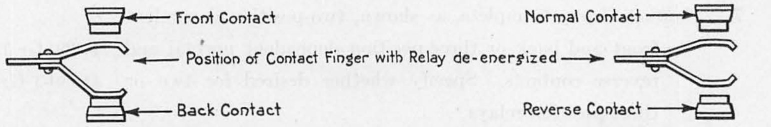


FIG. A
Contacts for Two Position Relay

FIG. B
Contacts for Three Position Relay

Front contacts are made when the relay is energized, back contacts are made when the relay is de-energized. Normal and reverse contacts are made when the relay is energized, the normal and reverse positions being dependent upon the polarity of the current applied to one of the two phases.

Drawing references are shown for convenience in checking shipping lists and invoices.

Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
1	Contact Group Complete, as shown, two-position upper independent front or three-position upper independent normal contact. Specify whether desired for two or three-position relays....................................	41960-2 Gr 5
3	Contact Group Complete, as shown, two two-position independent front or two three-position independent normal contacts. Specify whether desired for two or three-position relays....................................	41960-3 Gr 5

PLATE N0114

Contact Groups

For Model 2A Relays
Silver to Carbon Contacts

Drawing references are shown for convenience in checking shipping lists and invoices.

Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
6	Contact Group Complete, as shown, two-position independent front and independent back or three-position independent normal and independent reverse contacts. Specify whether desired for two or three-position relays..	41960-4 Gr 8 41960-5 Gr 7
6a	as above, except lower contact arranged as independent de-energized to reverse contact for use on three-position relays. Lower contact is opened with relay in normal position..	41960-5 Gr 10
7	Contact Group Complete, as shown, two-position dependent front and back or three-position dependent normal and reverse contacts. Specify whether desired for two or three-position relays................................	41960 Gr 5 41960-1 Gr 7
8	Terminal Posts Complete, as shown, for stator windings. Includes two connectors............................	41960-10 Gr 1
9	Contact Group Complete, as shown, de-energized contact for use on three-position relays only. Circuit is made when relay is de-energized and broken when relay is energized in either the normal or reverse positions..............	41960-6 Gr 3
10	Contact Group Complete, as shown, equipped with magnetic blowout. For use on six-way, two-position relays when it is desired to break heavy direct currents at comparatively high voltages. Specify amperage and voltage of current to be broken. The front contacts are silver to carbon and are designed to carry 25 amperes alternating current continuously or break 25 amperes alternating current at 110 volts. The back contacts will carry 25 amperes direct current continuously, two contacts being carbon to carbon for breaking this current at 110 volts and two contacts being silver to silver.................	41960-7 Gr 4
11	Contact Group Complete, as shown, two two-position independent back or two three-position independent reverse contacts. Specify whether desired for two or three-position relays....................................	41960-8 Gr 5

PLATE N0114

Contact Groups

For Model 2A Relays Silver to Carbon Contacts

Drawing references are shown for convenience in checking shipping lists and invoices.

Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
12	Contact Group Complete, as shown, independent upper de-energized to normal contact and independent lower de-energized to reverse contact. Upper contact is opened with relay in reverse position only. Lower contact is opened with relay in normal position only. For use on three-position relays	41960-12 Gr 1
25	Terminal Screw, No. 14—24 sq. hd., for contact fingers and posts	45709-2
26	Nut, No. 14—24 hex., for terminal screws	42843-1
27	Washer, for terminal screws	1225-2
28	Nut, No. 14—24 hex., for terminal screws	42839-1
29	Plug, for spare holes	39799
30	Screw, No. 4—36 x ¾″ hex. hd., for adjusting contact fingers. Includes washer	38090 34482
31	Spring, for contact fingers	42570
32	Bearing, for contact fingers	34429
33	Screw, No. 4—36 x 5/16″ rd. hd., for fastening bearing to contact block	28094-4
34	Lock Nut, No. 4—36, for contact finger adjusting screws	18689-2
35	Upper Contact Support, as shown, for front or normal contacts	34432
36	Nut, No. 10—32 hex., for contacts	40795
37	Contact Complete, carbon	34435 Gr 3
38	Contact Finger Complete, upper independent front silver contact for two-position relays. Includes beaded connector.	41540-2 Gr 3
39	Contact Finger Complete, upper independent normal silver contact for three-position relays. Includes beaded connector	41540-2 Gr 3
40	Contact Finger Complete, lower independent front silver contact for two-position relays. Includes connector and binding post	41540-8 Gr 3
41	Contact Finger Complete, lower independent normal silver contact for three-position relays. Includes connector and binding post	41540-8 Gr 3

PLATE N0114

Contact Groups

For Model 2A Relays
Silver to Carbon Contacts

Drawing references are shown for convenience in checking shipping lists and invoices.

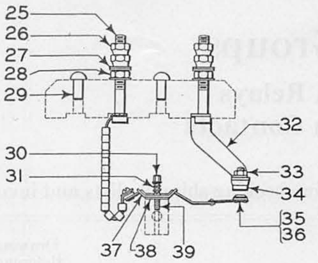
Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
42	Lower Contact Support, as shown, for front or normal contacts	34431
43	Contact Finger Complete, lower independent back silver contact for two-position relays. Includes connector and binding post....................................	41540-9 Gr 3
44	Contact Finger Complete, lower independent reverse silver contact for three-position relays. Includes connector and binding post....................................	41540-9 Gr 3
44a	as above, except arranged for use as lower independent de-energized to reverse contact. Requires screw Fig. 49 and spring Fig. 50....................................	41540-9 Gr 3
45	Lower Contact Support, as shown, for back or reverse contacts	35921
46	Contact Finger Complete, dependent front and back silver contacts, for two-position relays. Includes beaded connector....................................	41540 Gr
47	Contact Finger Complete, dependent normal and reverse silver contacts for three-position relays. Includes beaded connector....................................	41540-1 Gr 3
48	Contact Finger Complete, de-energized, silver contacts for three-position relays. Includes beaded connector......	41540-6 Gr 3
49	Screw, No. 4—36 x 1″ hex. hd., for adjusting de-energized contact fingers. Includes washer.......................	42525 34482
50	Spring, for de-energized contact fingers....................	36110
51	Upper Contact Support, as shown, for back or reverse contacts.	34432-5
52	Contact Finger Complete, upper independent back silver contact for two-position relays. Includes beaded connector....................................	41540-3 Gr 4
53	Contact Finger Complete, upper independent reverse silver contact for three-position relays. Includes beaded connector....................................	41540-3 Gr 4
54	Connector, for terminal posts...........................	29288-1
55	Contact Finger Complete, as shown, for use as upper independent de-energized to normal contact..............	41540-2 Gr 5
56	Eyelet, for wires.......................................	37697

Contact Groups

For Model 2A Relays
Silver to Carbon Contacts

Drawing references are shown for convenience in checking shipping lists and invoices.

Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
57	Screw, No. 14—24 x 1⅜" rd. hd., for yokes	48563-1
58	Connector, as shown	35101
59	Screw, No. 10—32 x ½" fl. hd., for fastening contact supports to cores	2437
60	Coil, only, as shown	36144
61	Pin, 1⁄16" x ½", for fastening contact supports to cores	7425
62	Screw, No. 14—24 x 1" rd. hd., for mounting base	50596-1
63	Yoke, as shown. Two required	39822
64	Base, only, as shown	39821
65	Contact Support Complete with carbon contact	13026-2 36147
66	Core, only	36146
67	Contact Finger Complete, for contact group Fig. 10. Includes carbon contact and beaded connector	41540-5 Gr 4
68	Contact Support Complete with silver contact	36148 42595
69	Washer, fibre, for use under coils	36149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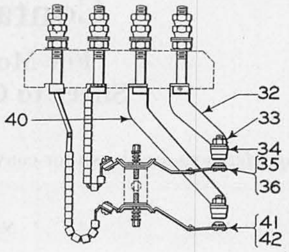
1

TWO POS. INDEPENDENT FRONT UPPER
THREE POS. INDEPENDENT NORMAL UPPER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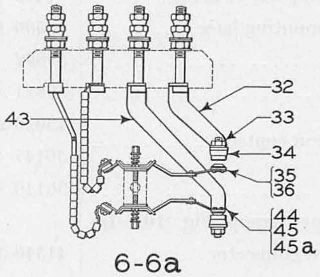
3

TWO POS. INDEPENDENT FRONT
THREE POS. INDEPENDENT NORMAL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44
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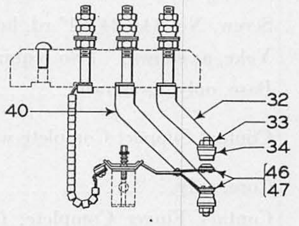
45a

6-6a

TWO POS. IND. FRONT AND IND. BACK
THREE POS. IND. NORMAL AND IND. REVERSE
THREE POS. UPPER IND. NORMAL AND IND.
LOWER DE-ENERGIZED TO REVERSE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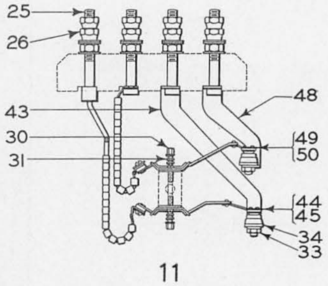
7

TWO POS. DEP. FRONT AND BACK
THREE POS. DEP. NORMAL AND REVERSE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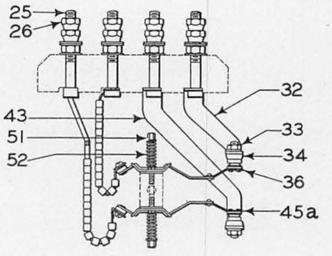
11

TWO POS. INDEPENDENT BACK
THREE POS. INDEPENDENT REVERSE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45a

12

IND. UPPER DE-ENERGIZED TO NORMAL
IND. LOWER DE-ENERGIZED TO REVERSE
FOR THREE POS. RELAY ONLY.

Contact Groups for Model 2A Relays
Graphite to Graphite Contacts

Contact Groups

For Model 2A Relays
Graphite to Graphite Contacts

Note: Binding posts for all contact groups listed below have A. R. A. standard No. 14—24 threads. Relays have been furnished with binding posts with ¼″—24 threads which must be specified if desired.

When ordering contact groups always specify whether desired for two or three-position relay. If special contact adjustment is desired, same must be specified.

Contact groups as listed below are furnished with graphite to graphite contacts.

Drawing references are shown for convenience in checking shipping lists and invoices.

Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
1	Contact Group Complete, as shown, two-position upper independent front or three-position upper independent normal contact. Specify whether desired for two or three-position relay..	41960-2
3	Contact Group Complete, as shown, two two-position independent front or two three-position independent normal contacts. Specify whether desired for two or three-position relay..	41960-3 Gr 8
6	Contact Group Complete, as shown, two-position independent front and independent back or three-position independent normal and independent reverse contacts. Specify whether desired for two or three-position relay......	41960-4 Gr 6 41960-5
6a	as above, except lower contact arranged as independent deenergized to reverse contact for use on three-position relays. Lower contact is opened with relay in normal position..	41960-5 Gr 9
7	Contact Group Complete, as shown, two-position dependent front and back or three-position dependent normal and reverse contacts. Specify whether desired for two or three-position relay..	41960 41960-1 Gr 10
11	Contact Group Complete, as shown, two two-position independent back or two three-position independent reverse contacts. Specify whether desired for two or three-position relay..	41960-8

PLATE N0116

Contact Groups

For Model 2A Relays
Graphite to Graphite Contacts

Drawing references are shown for convenience in checking shipping lists and invoices.

Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
12	Contact Group Complete, as shown, independent upper de-energized to normal contact and independent lower de-energized to reverse contact. Upper contact is opened with relay in reverse position only. Lower contact is opened with relay in normal position only. For use on three-position relays	41960-12
25	Terminal Screw, No. 14—24 sq. hd., for contact fingers and posts	45709-2
26	Nut, No. 14—24 hex., for terminal screws	42843-1
27	Washer, for terminal screws	1225-2
28	Nut, No. 14—24 hex., for terminal screws	42839-1
29	Plug, for spare holes	39799
30	Screw, No. 4—36 x ¾″ hex. hd., for adjusting contact fingers. Includes washer	38090 34482
31	Spring, for contact fingers	42570
32	Upper Contact Support, as shown, for front or normal contacts	34432
33	Nut No. 10—32 hex., for contacts	40795
34	Contact Complete, graphite	34435 Gr 1
35	Contact Finger Complete, upper independent front graphite contact for two-position relays. Includes beaded connector	41540-10 Gr 4
36	Contact Finger Complete, upper independent normal graphite contact for three-position relays. Includes beaded connector	41540-10 Gr 4
37	Bearing, for contact fingers	34429
38	Lock Nut, No. 4—36, for contact finger adjusting screws	18689-2
39	Screw, No. 4—36 x 5/16″ rd. hd., for fastening bearing to contact block	28094-4
40	Lower Contact Support, as shown, for front or normal contacts	34431
41	Contact Finger Complete, lower independent front graphite contact for two-position relays. Includes connector and binding post	41540-4 Gr 4

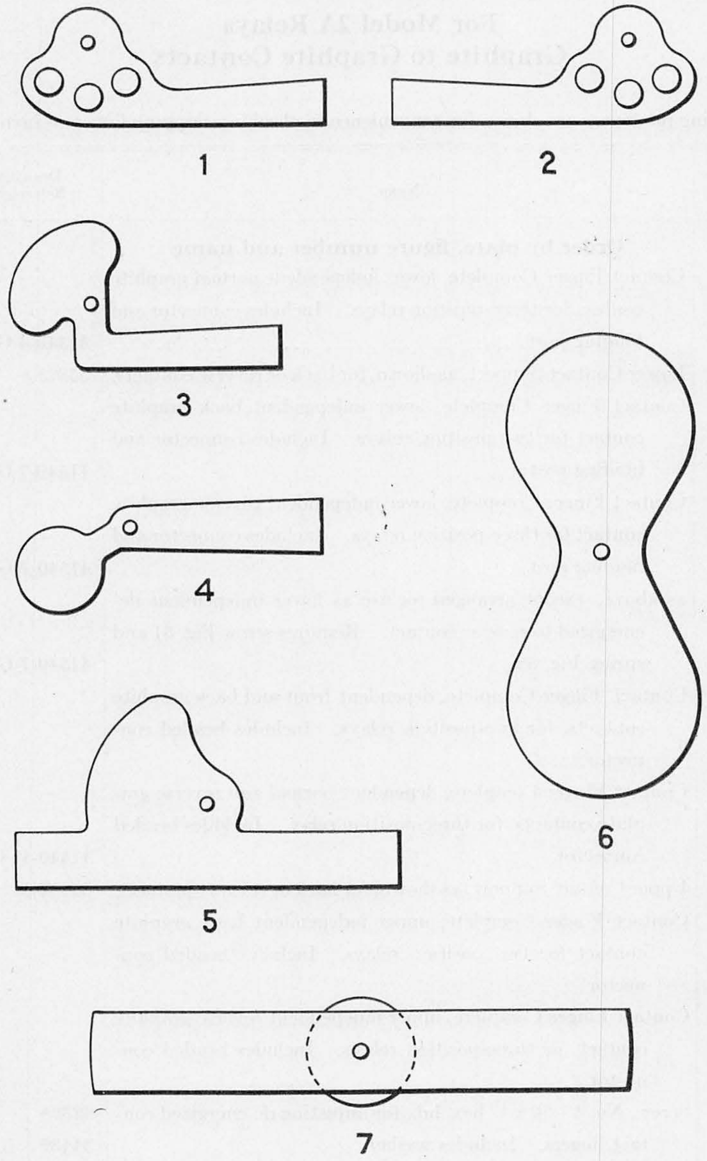
Contact Groups

For Model 2A Relays
Graphite to Graphite Contacts

Drawing references are shown for convenience in checking shipping lists and invoices.

Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
42	Contact Finger Complete, lower independent normal graphite contact for three-position relays. Includes connector and binding post.	41540-4 Gr 4
43	Lower Contact Support, as shown, for back or reverse contacts.	35921
44	Contact Finger Complete, lower independent back graphite contact for two-position relays. Includes connector and binding post.	41540-7 Gr 4
45	Contact Finger Complete, lower independent reverse graphite contact for three-position relays. Includes connector and binding post.	41540-7 Gr 4
45a	as above, except arranged for use as lower independent de-energized to reverse contact. Requires screw Fig. 51 and spring Fig. 52.	41540-7 Gr 4
46	Contact Finger Complete, dependent front and back graphite contacts, for two-position relays. Includes beaded connector.	
47	Contact Finger Complete, dependent normal and reverse graphite contacts, for three-position relay. Includes beaded connector.	41540-11 Gr 4
48	Upper Contact Support, as shown, for back or reverse contacts.	34432-5
49	Contact Finger Complete, upper independent back graphite contact for two position relays. Includes beaded connector.	
50	Contact Finger Complete, upper independent reverse graphite contact for three-position relays. Includes beaded connector.	
51	Screw, No. 4—36 x 1″ hex. hd., for adjusting de-energized contact fingers. Includes washer.	42525 34482
52	Spring for de-energized contact fingers.	36110

PLATE N0117



Blades for Model 2A Indicating Relays

Blades

For Model 2A Indicating Relays

Note: When ordering blades always specify color and striping.

Drawing references are shown for convenience in checking shipping lists and invoices.

Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
1	Blade, right hand upper quadrant........................	
2	Blade, left hand upper quadrant..........................	
3	Blade, right hand upper quadrant........................	
4	Blade, right hand lower quadrant.........................	
5	Blade, right hand lower quadrant.........................	
6	Disc..	
7	Blade, center suspended................	

Memoranda

2BRelays
Induc-
tion
Non-Mag
Rotor
2

Section N, Part 2

Model 2B Alternating-Current Relays

Induction, Non-Magnetic Rotor Type

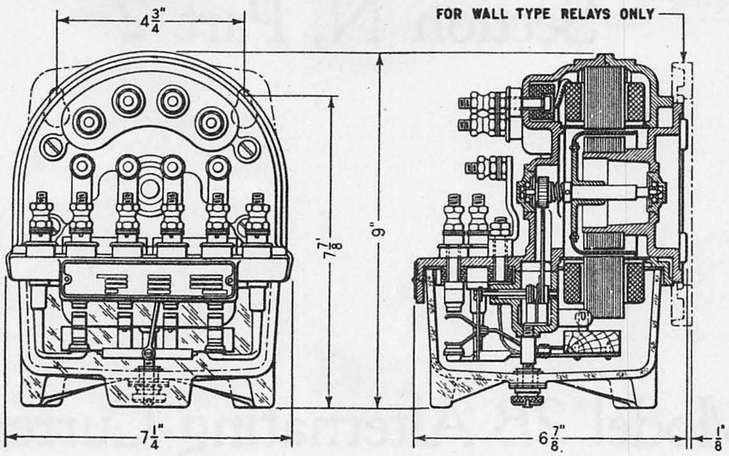

4 3/4"
FOR WALL TYPE RELAYS ONLY
7 7/8"
9"
7 1/4"
6 7/8"
1/8"

Fig. A2
Model 2B Relay—Four Way

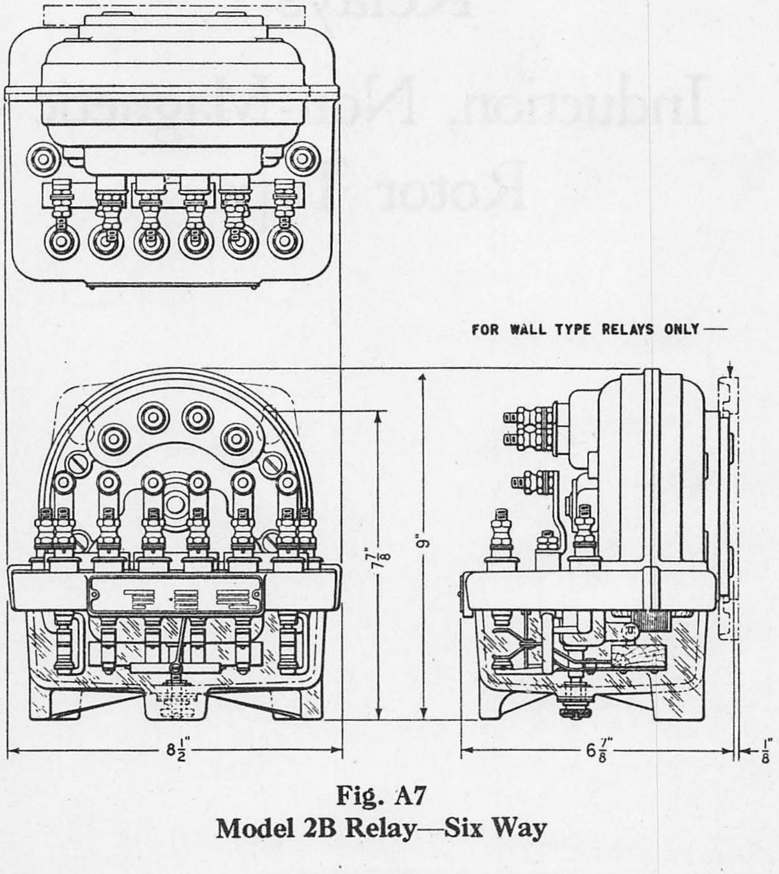

FOR WALL TYPE RELAYS ONLY
7 7/8"
9"
8 1/2"
6 7/8"
1/8"

Fig. A7
Model 2B Relay—Six Way

Model 2B Alternating-Current

Relays

Four and Six Way, Two and Three Position

Note: The Model 2B Relays as illustrated on opposite page are designed principally for use as line relays. They are, however, used as track relays in connection with short track circuits on Steam Roads. The two position relays are also used in connection with short track circuits on Electric Traction Lines employing direct-current for propulsion.

When ordering two position relays, specify whether regular or quick acting relay is desired. Quick acting relays have provision for making a quicker pick-up and drop-away, but require more energy for equal contacting power than regular relays.

When it is desired to mount relay on wall, same must be specified so that plate as shown in dot and dash lines can be furnished. Relays are furnished with silver to graphite contacts. Contact posts are R. S. A. Standard No. 14–24 threads.

If energized contact or de-energized contact for three position relays and if contact posts, contacts or contact combination other than those listed are desired, same must be specified. See Plate N0213 for energized contact, de-energized contact, contact groups and contact parts. The contacts are limited to a maximum of four front or normal and two back or reverse in the four way relays and six front or normal and two back or reverse in the six way relays.

When it is desired to duplicate a relay or when ordering repair parts, always refer to name plate of relay in question and give drawing number and other data shown thereon.

Specifications for Line Relays

When ordering, specify frequency of signaling current, operating voltage, line resistance, and whether relay is to be operated from single circuit or from two circuits. If operated from two circuits, give local and line operating voltages. Standard voltages are 55 volts, 25 cycles and 110 volts, 60 cycles. Note: Relays wound for operation from two circuits will also operate from a single circuit source, providing the local and line operating voltages are the same, the phase displacement being secured in the windings of the relay. Ordinarily two position relays are arranged for single circuit operation. Three position relays are always arranged for two circuit operation.

Specifications for Track Relays

When it is desired to use the Model 2B Relay as a track relay, always give information as requested on Plate N0101.

Continued on next page

PLATE NO201

GENERAL RAILWAY SIGNAL COMPANY April 1917

Model 2B Alternating-Current

Relays

Four and Six Way, Two and Three Position

Order by plate, figure number and name

Model 2B Relays—Two Position

Fig. No.	CONTACTS			4 or 6 way case	Drawing Reference
	Independent		Dependent		
	Front	Back	Front and Back		
A	2	0		4	
A1	2	2		4	
A2	2		2	4	
A 3			2	4	
A 4	2	2	2	6	
A 5	4	0		4	
A 6	4	2		6	
A 7	4		2	6	
A 8			3	4	
A 9			4	6	
A10	6	0		6	

Model 2B Alternating-Current

Relays

Four and Six Way, Two and Three Position

Order by plate, figure number and name

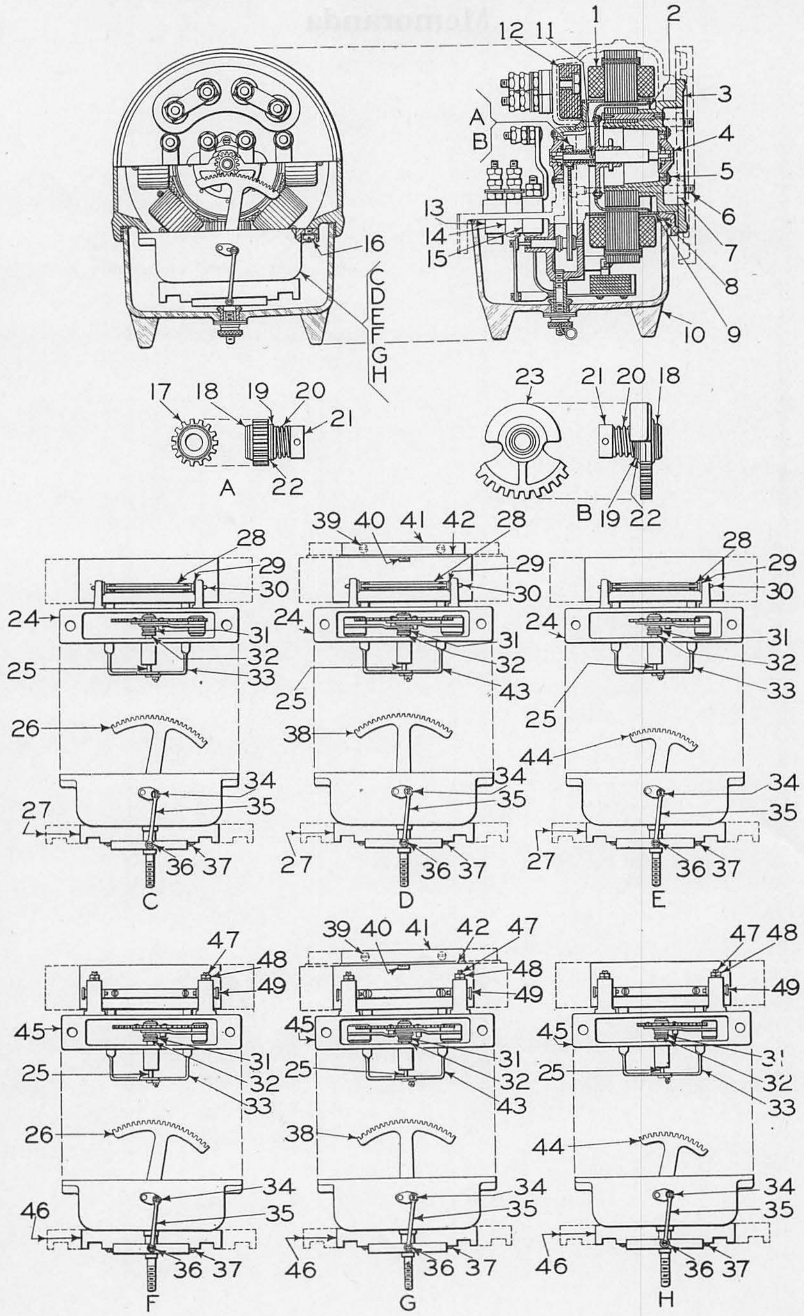
Model 2B Relays—Three Position

Fig. No.	CONTACTS			4 or 6 way case	Drawing Reference
	Independent		Dependent		
	Normal	Reverse	Normal and Reverse		
B	2	0		4	
B 1	2	2		4	
B 2	2		2	4	
B 3			2	4	
B 4	2	2	2	6	
B 5	4	0		4	
B 6	4	2		6	
B 7	4		2	6	
B 8			3	4	
B 9			4	6	
B10	6	0		6	

Memoranda

Memoranda

PLATE N0202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Detail Parts for Model 2 Form B Relays

PLATE N0202

Model 2B Alternating Current Relays
Four and Six-Way, Two and Three-Position

Detail Parts

Note: The details shown on this plate are for the relays shown on Plate N0201 and N0203.

The parts listed below are chiefly moving and electrical parts. Contact Groups are shown on Plate N0214.

When ordering mechanisms, sectors, rotors, stators, etc., refer to name plate of relay for which parts are required and give drawing number and other data shown thereon.

Drawing references are shown for convenience in checking shipping lists and invoices.

Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
A	Pinion Complete, for regular relays	36187 Gr 1
B	Sector Complete, for quick acting relays	37563-1 Gr 1
C	Mechanism Complete, for four-way, regular, two-position relay. Has pin for bearings of contact block	37573 Gr 1
C1	as above, except for six-way relay. Has counterweight for use with less than 5 back contacts	37573 Gr 3
C2	same as Fig. C, except for six-way relay. Has counterweight for use with 5 or more back contacts	37573 Gr 5
D	Mechanism Complete, for four-way, three-position relay. Has pin for bearings of contact block	37573-1 Gr 1
D1	as above, except for six-way relay	37573-1 Gr 3
E	Mechanism Complete, for four-way, quick acting, two-position relay. Has pin for bearings of contact block	37573-2 Gr 1
E1	as above, except for six-way relay	37573-2 Gr 3
F	Mechanism Complete, for four-way, regular, two-position relay. Has trunnions for bearings of contact block	37573-3 Gr 1
F1	as above, except for six-way relay. Has counterweight for use with less than 5 back contacts	37573-3 Gr 3
F2	same as Fig. F, except for six-way relay. Has counterweight for use with 5 or more back contacts	37573-3 Gr 5
G	Mechanism Complete, for four-way, three-position relay. Has trunnions for bearings of contact block	37573-4 Gr 1
G1	as above, except for six-way relay	37573-4 Gr 3
H	Mechanism Complete, for four-way, quick acting, two-position relay. Has trunnions for bearings of contact block	37573-5 Gr 1

PLATE N0202

Model 2B Alternating Current Relays
Four and Six-Way, Two and Three-Position

Detail Parts

Drawing references are shown for convenience in checking shipping lists and invoices.

Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
H1	as above, except for six-way relay	37573-5 Gr 3
1	Stator Complete. Give data shown on name plate of relay	41598
2	Rotor Complete. Give data shown on name plate of relay	37332 Gr 1
3	Core Complete. Give data shown on name plate of relay	37438 Gr 1
4	Bearing Complete, for rotor shaft. Two required	37419 Gr 1
5	Screw, No. 6—32 x 3/16" rd. hd., for bearings. Includes lock washer	2613-4 53029-1
6	Screw, No. 14—24 x 3½" fill. hd., for fastening front and rear cases	37551-1
7	Spanner Nut, No. 14—24, for screw Fig. 6	42840
8	Gasket, for case Fig. 10, for four-way relay	13014
8a	as above, except for six-way relay	13014
9	Shield, for rotor. Two required	37362
10	Case Complete, glass, for four-way relay. Includes nut and washers	37379 Gr 3
11	Taper Pin, No. 000 x ¾", for fastening pinion and sector to rotor shaft	34891
12	Terminal Block, for stator leads	37440
13	Insulation Block, for use above cover for contact finger terminals and below cover for front contacts	47508
14	Insulation Block, for use below cover in spaces 1 and 4 for back contact on four-way relay	42567
14a	as above, except for use in spaces 1 and 6 for contact finger terminals on six-way relay	42568
15	Insulation Block, for use below cover for contact finger terminals	42938
16	Screw, No. 14—24 x 5/8" fill. hd., for fastening mechanism to case	12977
17	Pinion, only, for Fig. A	36188
18	Sleeve, for pinion	37566
19	Washer, for use between fibre washer and spring	34454
20	Spring, for sleeve	34438

Model 2B Alternating Current Relays
Four and Six-Way, Two and Three-Position

Detail Parts

Drawing references are shown for convenience in checking shipping lists and invoices.

Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
21	Collar, for sleeve	34452
22	Washer, fibre	34455
23	Sector, only, for Fig. B	37565
24	Bracket Complete, for Figs. C, D and E. Includes bushings for sector shaft and stud and bushing for case	37323-1 Gr 1
25	Sector Shaft Complete, includes crank for operating contact block	42535 Gr 1
26	Sector Complete, includes small counterweight. For use with Figs. C, C1, F and F1	37563-2 Gr 1
26a	as above, except having large counterweight for Figs. C2 and F2	37563-2 Gr 2
27	Contact Block, only, for four-way relay in Figs. C, D and E	37369
27a	as above, except for six-way relay	37371
28	Support, for contact block in Figs. C, D and E	37361-1
29	Washer, ⅛″, for pin, Fig. 30	42403
30	Pin, for support Fig. 28	47230
31	Spring, for collar on sector	42539
32	Sleeve, for sector shaft	42541
33	Contact Lever, for use in Figs. C, E, F and H	37360-5
34	Screw, No. 6-32 fill. hd., for fastening link to sector shaft	34412
35	Link, for operating contact lever	37367-1
36	Screw, No. 6-32 fill. hd., with hex. nut, for fastening link to contact lever	37696 37404-1
37	Screw, No. 6-32 x ½″ rd. hd., for fastening contact lever to contact block	3913-1
38	Sector Complete, includes counterweights, for three-position relay. For use in Figs. D and G	37563-3 Gr 1
39	Screw, No. 6-32 x ⅜″ rd. hd., for fastening counterweight to contact lever	2999-1
40	Screw, No. 6-32 x ¼″ rd. hd., for fastening insulation to counterweight	2613-1
41	Counterweight, for four-way relays	37416

Model 2B Alternating Current Relays
Four and Six-Way, Two and Three-Position

Detail Parts

Drawing references are shown for convenience in checking shipping lists and invoices.

Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
41a	as above, except for six-way relays	37417
42	Insulation, for counterweight, for four-way relay	37412
42a	as above, except for six-way relay	37413
43	Contact Lever, for use in Figs. D. and G	37360-2
44	Sector Complete, includes counterweight. For use with Figs. E and H	37563 Gr 1
45	Bracket Complete for Figs. F, G and H. Includes bushings for sector shaft and stud and bushing for case	37323-2 Gr 1
46	Contact Block Complete, for four-way relay. Includes support for mounting to trunnions	51537-3 Gr 1
46a	as above, except for six-way relay	51537-4 Gr 1
47	Set Screw, No. 8—32 x 9/16″ headless, for trunnion	412-3
48	Nut, No. 8—32 hex., for screw, Fig. 47	3891-1
49	Trunnion, for contact block	29545-12

Memoranda

PLATE NO203

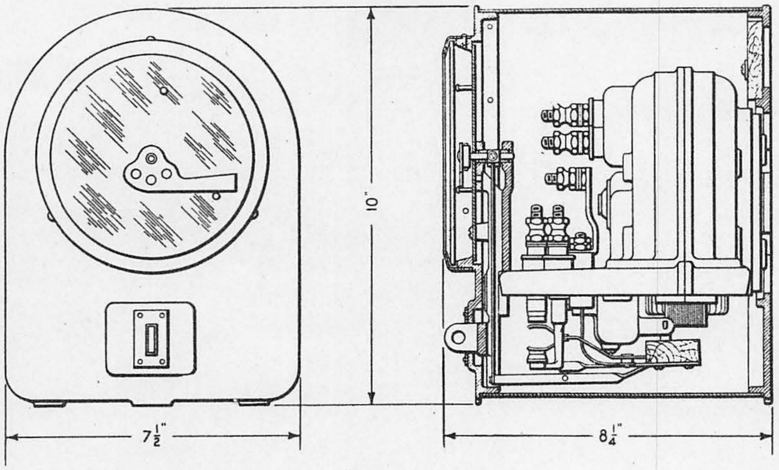


Fig. A2
Model 2B Indicating Relay—Four Way

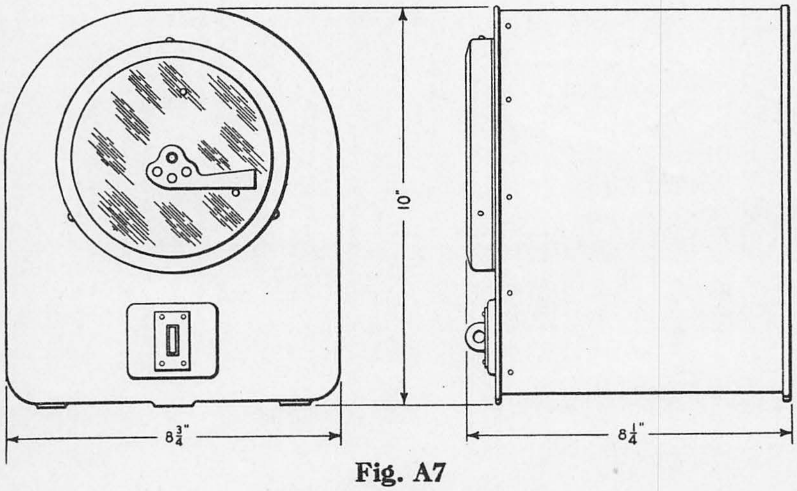


Fig. A7
Model 2B Indicating Relay—Six Way

Model 2B Alternating-Current

Indicating Relays

Four and Six Way, Two Position

Note: The Model 2B two position Relays as shown on Plate N0201 may be mounted in case with indicating attachment as shown on opposite page. This is practicable at interlockings on Steam Roads or on Electric Traction Lines employing single rail track circuits when it is desired to locate the relay in the tower a long distance from its point of connection to the rails.

The case is so designed that it may be mounted on wall or shelf as desired.

See Plate N0215 and specify blade required. Also specify color and striping of blade, degrees of movement and position of blade when relay is de-energized.

For further order information and specifications see Plate N0201.

When it is desired to duplicate an indicating relay or when ordering repair parts, always refer to name plate on relay in question and give drawing number and other data shown thereon.

Order by plate, figure number and name

Model 2B Indicating Relays—Two Position

Fig. No.	CONTACTS			4 or 6 way case	Drawing Reference
	Independent		Dependent		
	Front	Back	Front and Back		
A	2	0		4	
A 1	2	2		4	
A 2	2		2	4	
A 3			2	4	
A 4	2	2	2	6	
A 5	4	0		4	
A 6	4	2		6	
A 7	4	0	2	6	
A 8			3	4	
A 9			4	6	
A10	6	0		6	

Memoranda

Memoranda

PLATE NO205

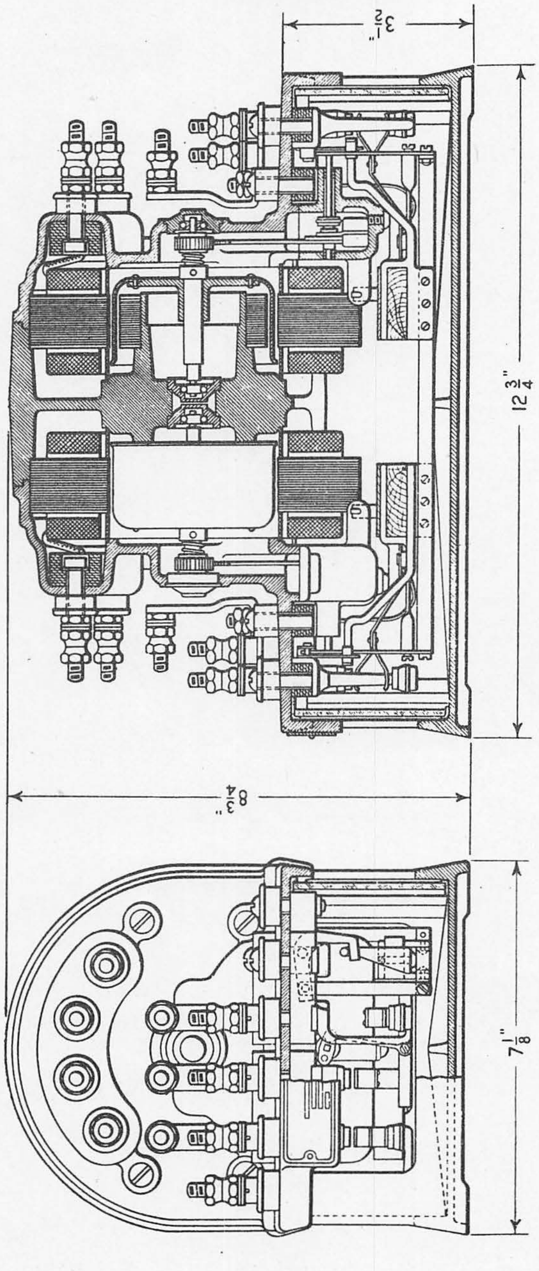


Fig. A3

Model 2B Interlocking Relay

Model 2B Alternating-Current

Interlocking Relays

Two Position

Note: When ordering relays complete, always give information requested on Plate N0101.

The Model 2B Interlocking Relay as illustrated on opposite page is designed principally for use as a track relay on Steam Roads and on Electric Traction Lines employing direct-current for propulsion. It can, however, be used as a line relay but is never used as a track relay on roads employing alternating-current for propulsion.

This relay is best described when it is said that it consists of two Model 2B relays placed back to back to form a unit which is mounted on a special base. Mechanical interlocking exists between these two mechanisms which controls their operation so that when installed on single track work a train approaching the relay from either direction will ring a bell until it has arrived at the relay location. After the train has passed the relay location, the bell stops ringing.

Each relay will be equipped with bell ringing contacts. There is one end space and one intermediate space available for extra contacts on each side of the relay.

Interlocking Relays are furnished with silver to graphite contacts with the exception of the bell ringing contact, which is silver to silver. Contact posts are R. S. A. Standard No. 14–24 threads.

If contact posts, contacts or contact combination other than those listed are desired, same must be specified. See Plate N0213 for contact groups and contact parts.

When it is desired to duplicate an interlocking relay or when ordering repair parts, always refer to name plate of relay in question and give drawing number and other data shown thereon.

Drawing references are shown for convenience in checking shipping lists and invoices.

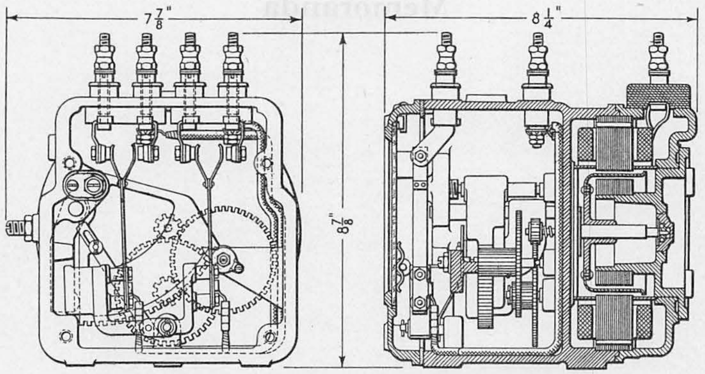
Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
A	Model 2B Interlocking Relay Complete. Equipped with one bell ringing contact on each side of the relay.............	
A1	as above, except equipped with one bell ringing contact and one independent front contact on each side..............	

Model 2B Alternating-Current
Interlocking Relays
Two Position

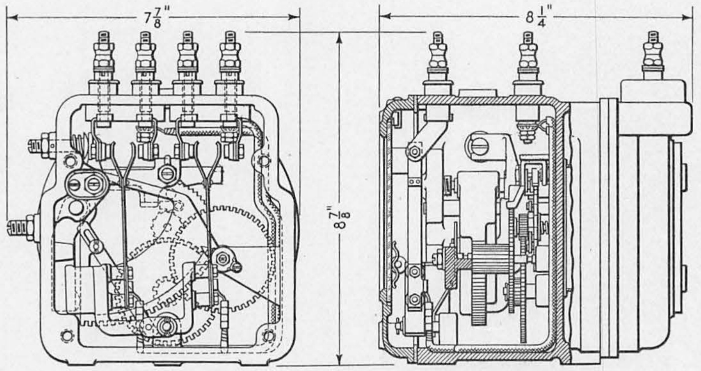
Drawing references are shown for convenience in checking shipping lists and invoices.

Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
A2	same as Fig. A, except equipped with one bell ringing contact and one dependent front and back contact on each side. . .	
A3	same as Fig. A, except equipped with one bell ringing contact, one independent front contact and one dependent front and back contact on each side.	
A4	same as Fig. A, except equipped with one bell ringing contact, one independent back contact and one dependent front and back contact on each side.	

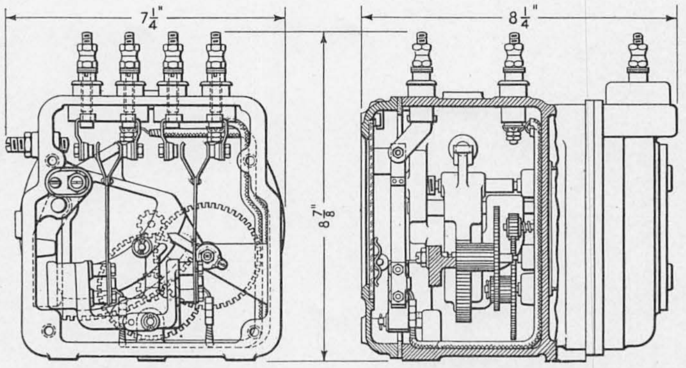
Memoranda



A-TIME ELEMENT CLOSING RELAY — 0 TO 15 SECONDS AT 60 CYCLES
B-TIME ELEMENT CLOSING RELAY — 0 TO 28 SECONDS AT 25 CYCLES



C-TIME ELEMENT CLOSING RELAY — 0 TO 90 SECONDS AT 25 CYCLES
D-TIME ELEMENT CLOSING RELAY — 0 TO 90 SECONDS AT 60 CYCLES



E-TIME ELEMENT OPENING RELAY — 0 TO 20 SECONDS AT 25 CYCLES
F-TIME ELEMENT OPENING RELAY — 0 TO 15 SECONDS AT 60 CYCLES

Model 2B Time Element Relays

Model 2B Alternating Current

Time Element Relays

Note: The Model 2B Time Element Relays as illustrated on opposite page have essentially the same operating mechanism as the Model 2B Relays shown on Plate N0201. The principal difference being that a gear train is used in place of the pinion and sector movement for operating the contacts.

Time Element Relays are of two kinds: (1) Time Element Closing, in which the front contacts are not made until a predetermined time after the relay is energized and are immediately broken when the relay is de-energized. They operate as single circuit relays only. (2) Time Element Opening, in which the front contacts are made immediately when relay is energized and are not broken until a predetermined time after the relay is de-energized. They operate as two circuit relays only.

When ordering, specify frequency of signaling current and line resistance. For Time Element Closing Relays give the operating voltage. For Time Element Opening Relays give both the local and line operating voltages. Standard Voltages are 55 volts, 25 cycles and 110 volts, 60 cycles.

The time interval is easily adjusted from 0 seconds to the maximum time set for each relay, by means of an adjusting screw outside of the case. Binding posts are A. R. A. Standard No. 14—24 threads.

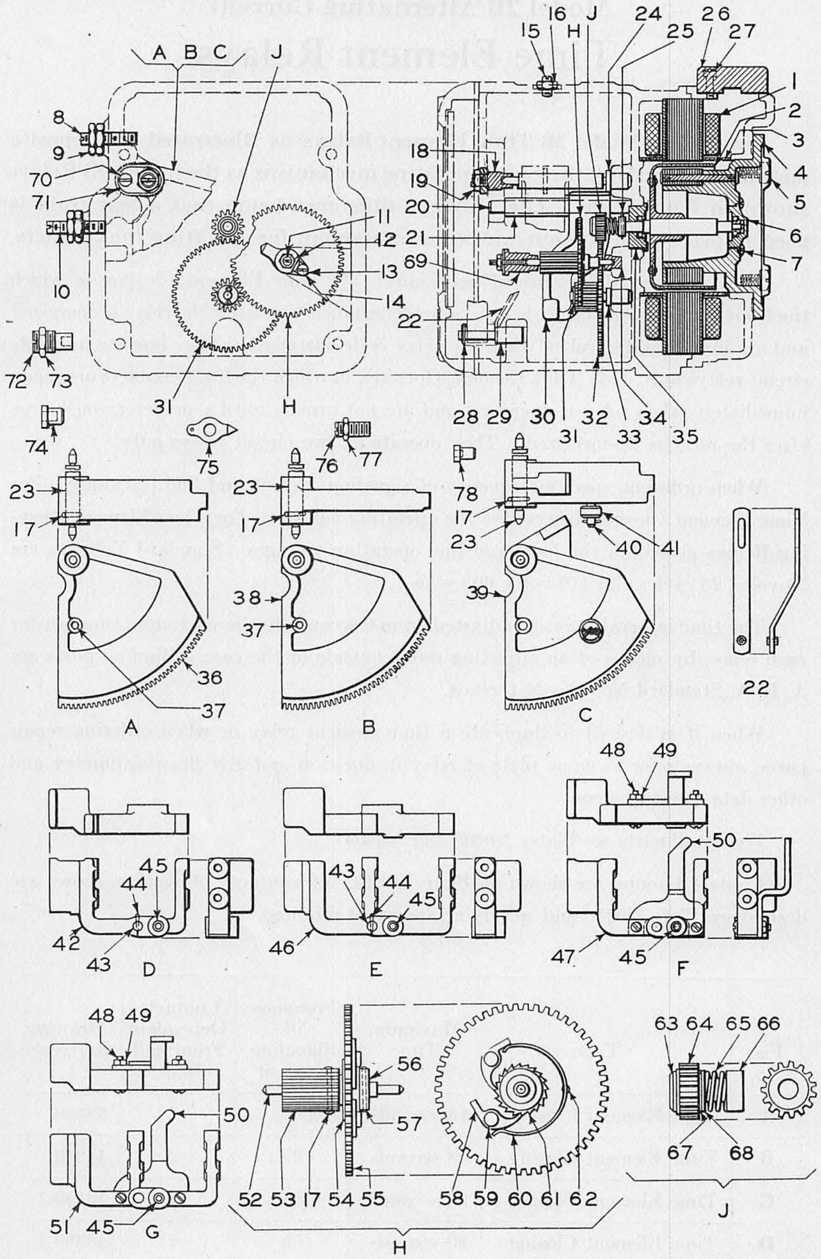
When it is desired to duplicate a time element relay or when ordering repair parts, always refer to name plate of relay in question and give drawing number and other data shown thereon.

For detail parts see Plates N0208 and N0209.

Contact Groups are shown on Plate N0210. If contacts other than shown are desired see Plate N0210 and specify arrangement required.

Fig. No.	Type	Maximum Time	Frequency of Signaling Current	Contacts Dependent Front and Back	Drawing Reference
A	Time Element Closing	15 seconds	60	2	43300
B	Time Element Closing	28 seconds	25	2	43300
C	Time Element Closing	90 seconds	25	2	43300-1
D	Time Element Closing	90 seconds	60	2	43300-1
E	Time Element Opening	20 seconds	25	2	43300
F	Time Element Opening	15 seconds	60	2	43300

PLATE N0208


A B C
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51 45
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52 53 17 54 55
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58 59 60 61 62
63 64 65 66
67 68
J

Detail Parts for
Model 2B Time Element Relays

Model 2B Alternating Current Time Element Relays

Detail Parts

Note: The details shown on this plate are for the relays shown on Plate N0207, Figs. A, B, E and F.

The parts listed below are chiefly moving and electrical parts. Contact groups are shown on Plate N0210.

When ordering sectors, counterweights, stators, etc., refer to name plate of relay for which parts are required and give drawing number and other data shown thereon

Bearings for sector shaft and 2nd intermediate gear shaft as used on relays of earlier design are shown separately by Figs. 72 to 78, inclusive. These parts are not interchangeable with the parts now used and shown on the assembly.

Drawing references are shown for convenience in checking shipping lists and invoices.

Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
A	Sector Complete, as shown. Give data shown on name plate of relay	49090-1
B	Sector Complete, as shown. Give data shown on name plate of relay	49090-1
C	Sector Complete, as shown. Give data shown on name plate of relay	49090
D	Counterweight Complete, for dependent contacts for use on time element closing relay	43306 Gr 1 43335-1 28985
E	Counterweight Complete, for independent contacts for use on time element closing relay	43306-1 Gr 1 43335-1 28985
F	Counterweight Complete, for dependent contacts for use on time element opening relay	43306 Gr 2
G	Counterweight Complete, for independent contacts for use on time element opening relay	43306-1 Gr 2
H	Gear Complete, 2nd intermediate, as shown	43303-1 Gr 1
J	Pinion Complete, for rotor shaft	36187 Gr 1
1	Stator Complete. Give data shown on name plate of relay	41598
2	Rotor Complete. Give data shown on name plate of relay	43301 Gr 1
3	Shield, as shown	37362
4	Core Complete. Give data shown on name plate of relay	37438 Gr 1
5	Screw, 1/4"-24 x 1/2" fill. hd., for fastening core to case	36137

Model 2B Alternating Current Time Element Relays

Detail Parts

Drawing references are shown for convenience in checking shipping lists and invoices.

Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
6	Ball Bearing Complete, rear, for rotor shaft	37419 Gr 1
7	Screw, No. 6-32 x 3/16″ rd. hd., for fastening ball bearing to core. Includes lock washer	2613-4 53029-1
8	Screw, 3/8″-16 x 1 3/4″ headless. Used as stop for sector, Fig. C	49076
9	Nut, 3/8″-16 hex., for screws Figs. 8 and 10	35519
10	Screw, 3/8″-16 x 1 1/2″ headless, for adjusting sector stop Fig. 30	43341
11	Screw, No. 6-32 headless for bearing Fig. 69	23308-1
12	Nut, No. 6-32 hex., for screw Fig. 11. Includes shakeproof washer	3614-1 53029-1
13	Finger, for sector	43340-1
14	Screw, No. 8-32 x 3/8″ fill. hd., for finger. Includes shakeproof washer	28989-3 53029-4
15	Screw, 1/4″-24 x 5/8″, headless, used as stop for sector	18140
16	Nut, 1/4″-24 hex., for screw Fig. 15	7395
17	Pin, No. 14 x 1″ for sector and for Fig. H	41839
18	Bearing, for sector shaft	43312-1
19	Nut, 3/8″-24, hex., for bearing Fig. 18	35614-2
20	Stud, for stop Fig. 30	43318
21	Spacer, for stud Fig. 20	43334
22	Link Complete, for operating counterweight	40727-2 Gr 1
23	Shaft, for sector	43326
24	Bearing, for shaft Fig. 23	43322-4
25	Taper Pin, No. 00 x 3/4″ for fastening pinion to rotor shaft	34891
26	Terminal Block, for stator leads	37651
27	Screw, No. 10-32 x 1/2″ fill. hd., for fastening terminal block to case	0472
28	Washer, 13/64″, for stud Fig. 29	3890-6
29	Stud, for counterweight	43327
30	Stop, for sector	43314
31	Washer, 13/64″, for stud Fig. 33	40791
32	Gear Complete, 1st intermediate	43302 Gr 1

Model 2B Alternating Current Time Element Relays

Detail Parts

Drawing references are shown for convenience in checking shipping lists and invoices.

Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
33	Stud, for 1st intermediate gear	441-132
34	Bearing, for 2nd intermediate gear	43322-5
35	Ball Bearing Complete, front, for rotor shaft	35532 Gr 1
36	Sector, only, for Fig. A	43319
37	Stud, for sectors Figs. A and B	43335
38	Sector, only, for Fig. B	43338
39	Sector, only, for Fig. C	49073
40	Pin, for roller, Fig. 41	49075
41	Roller, for operating counterweight	49074
42	Counterweight, only, for Fig. D	43313
43	Stud, for link	43335-1
44	Escutcheon Pin, for fastening stud Fig. 43 to counterweight	28985
45	Bushing, for counterweights	43342
46	Counterweight, only, for Fig. E	43313-1
47	Counterweight, only, for Fig. F	49071
48	Screw, No. 6-32 x ⅞″ rd. hd., for fastening lever to counterweight	15387
49	Nut, No. 6-32 hex., for screw Fig. 48	3614
50	Lever, only, as shown	49072
51	Counterweight, only, for Fig. G	43313-2
52	Shaft, for Fig. H	43345
53	Pinion, for Fig. H	43321-1
54	Washer, as shown	28355
55	Gear, only	43311-1
56	Hub, only	50934-1
57	Pin, 3/32″ x 25/32″, for hub	1286
58	Pawl, for ratchet wheel	50932
59	Stud, for pawls	50929
60	Spring, for pawls	50931
61	Rachet Wheel	50933
62	Stud, for spring	50930
63	Sleeve, only, for Fig. J	37566

PLATE N0208

GENERAL RAILWAY SIGNAL COMPANY February 1929

Model 2B Alternating Current Time Element Relays

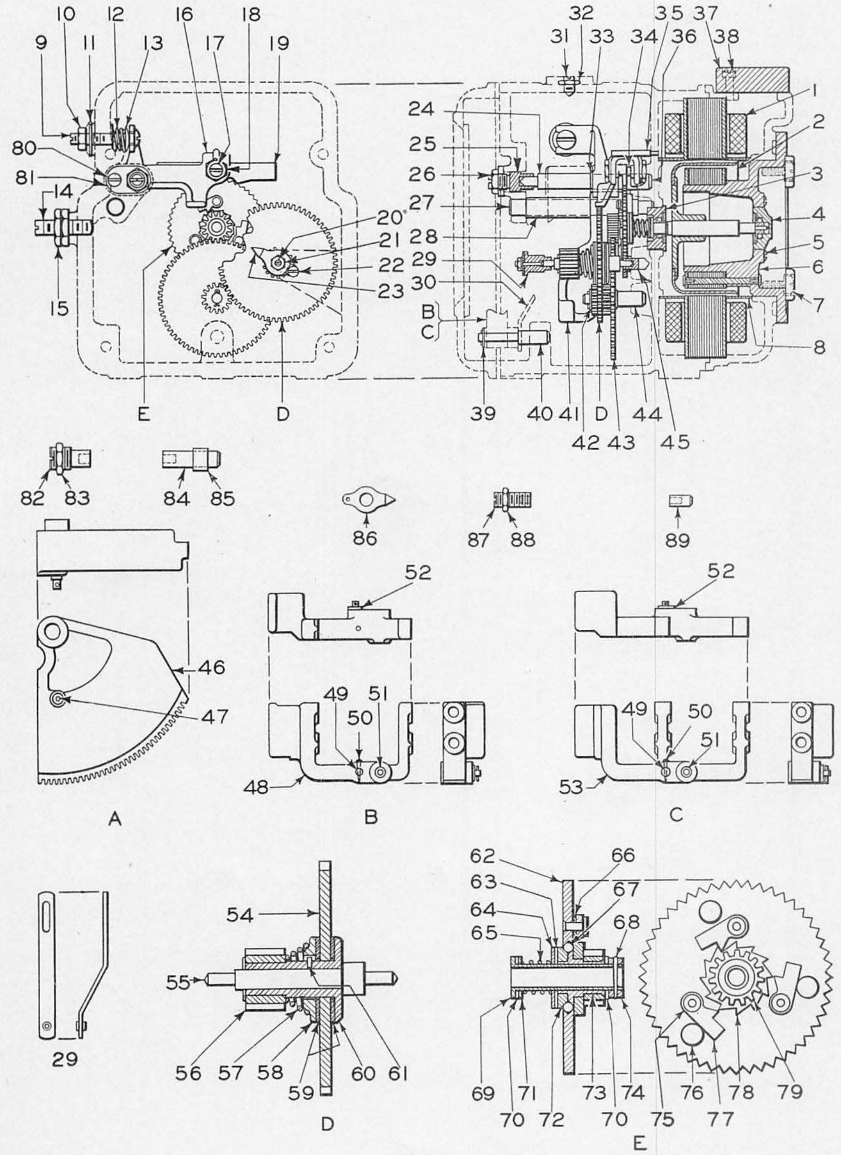
Detail Parts

Drawing references are shown for convenience in checking shipping lists and invoices.

Fig64P

Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
64	Pinion, for Fig. J	36188
65	Spring, for pinion	34438
66	Collar, for sleeve	34452
67	Washer, fibre	34455
68	Washer, for use between fibre washer and spring	34454
69	Bearing, for 2nd intermediate gear shaft	43312-2
70	Screw, No. 8-32 x 3/8″ fill. hd., for bearing Fig. 18. Includes shakeproof washer	12563-1 53029-3
71	Washer, for bearing Fig. 18	590-26
72	Bearing, for shaft Fig. 23. For use on earlier design of relays.	49696
73	Nut, 1/2″-24, hex., for bearing Fig. 72	43332
74	Rear Bearing for shaft Fig. 23. For use on earlier design of relays	43322-2
75	Finger, for use with sectors Figs. A. & C. For use on earlier design of relays. Includes escutcheon pin for attaching	43340 0738
75a	as above, except for use with sector, Fig. B	43344
76	Bearing, for 2nd intermediate gear. For use on earlier design of relays	43346
77	Nut, 5/16″-24 hex., for bearing, Fig. 76	43337-1
78	Bearing, for 2nd intermediate gear. For use on earlier design of relays	43322-3

Memoranda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Detail Parts for
Model 2B Time Element Relays

Model 2B Alternating Current
Time Element Relays

Detail Parts

Note: The details shown on this plate are for the relays shown on Plate N0207, Figs. C and D.

The parts listed below are chiefly moving and electrical parts. Contact groups are shown on Plate N0210.

When ordering sectors, counterweights, stators, etc., refer to name plate of relay for which parts are required and give drawing number and other data shown thereon.

Bearings for sector shaft and 2nd intermediate gear shaft as used on relays of earlier design are shown separately by Figs. 82 to 89, inclusive. These parts are not interchangeable with the parts now used and shown on the assembly.

Drawing references are shown for convenience in checking shipping lists and invoices.

Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
A	Sector Complete, as shown. Give data shown on name plate of relay	43319-1 38445 Gr 1
B	Counterweight Complete, for dependent contacts for use on time element closing relay	43313 43335 43342 28985 2534
C	Counterweight Complete, for independent contacts for use on time element closing relay	43313-1 43335 43342 28985 2534
D	Gear Complete, 2nd intermediate, as shown	43303-2 Gr 1
E	Escapement Wheel Complete, as shown	50909-1 Gr 1 34891-1
1	Stator Complete. Give data shown on name plate of relay	41598
2	Rotor Complete. Give data shown on name plate of relay	43301 Gr 2
3	Ball Race Complete, front, for rotor shaft	35532 Gr 2
4	Ball Bearing Complete, rear, for rotor shaft	37419 Gr 1
5	Screw, No. 6-32 x 3/16″ rd. hd., for fastening ball bearing to core. Includes lock washer	2613-4 53029-1
6	Core Complete. Give data shown on name plate of relay	37438 Gr 1

PLATE N0209

Model 2B Alternating Current Time Element Relays

Detail Parts

Drawing references are shown for convenience in checking shipping lists and invoices.

Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
7	Screw, ¼″-24 x ½″ fill. hd., for fastening core to case........	36137
8	Shield, as shown. Two required..........................	37362
9	Screw, No. 14-24 x 1½″ rd. hd., for arm Fig. 16............	40114-8
10	Nut, No. 14-24 hex., for screw Fig. 9.......................	50637-1
11	Pin, 3⁄32″ x 15⁄16″, for screw, Fig. 9..........................	18142
12	Spring, for screw, Fig. 9................................	50857-1
13	Sleeve, for spring, Fig. 12..............................	35076
14	Screw, ⅜″-16 x 1½″ headless, for sector stop................	43341
15	Nut, ⅜″-16 for screw, Fig. 14..........................	35519
16	Arm, for pallet......................................	38442
17	Bearing, front, for pallet..............................	38447
18	Nut, 5⁄16″-40 hex., for bearing Fig. 17......................	12578-3
19	Pallet, only..	50978-1
20	Screw, No. 6-32 x ⅞″, headless, for adjusting bearing for gear Fig. D..	23308-1
21	Nut, No. 6-32 x ⅛″ thick, hex., for screw Fig. 20, includes shakeproof washer..................................	3614-1 53029-1
22	Screw, No. 8-32 x ½″ fill. hd., for finger, includes shakeproof washer..................................	28989-3 53029-4
23	Finger, for sector....................................	43340-1
24	Shaft, for sector.....................................	43326-1
25	Bearing, for shaft Fig. 24............................	43312-1
26	Nut, ⅜″-24 x 3⁄16″ thick hex., for bearing Fig. 25............	35614-2
27	Stud, used as shaft for sector stop........................	43318
28	Spacer, for stud Fig. 27...............................	43334
29	Bearing, for gear Fig. D...............................	43312-2
30	Link Complete, for operating counterweight..............	40727-2 Gr 1
31	Screw, ¼″-24 x ⅝″, headless, used as stop for sector........	18140
32	Nut, ¼″-24 hex., for screw Fig. 31......................	7395
33	Washer, for shaft Fig. 24..............................	3890
34	Shaft, for pallet......................................	38449
35	Pin, 3⁄16″ x 1¼″, used as stop for pallet....................	34121-1

Model 2B Alternating Current Time Element Relays

Detail Parts

Drawing references are shown for convenience in checking shipping lists and invoices.

Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
36	Bearing for shaft Fig. 24	43322-6
37	Terminal Block, for stator leads	~~36751~~ 37651
38	Screw, No. 10-32 x 1/2″, fill. hd., for fastening terminal block to case	0472
39	Washer, 13/64″, for stud Fig. 40	3890-6
40	Stud, for counterweight	43327
41	Stop, for sector	43314
42	Washer, 13/64″, for stud Fig. 44	3890
43	Gear Complete, 1st intermediate	43302 Gr 2
44	Stud, for gear Fig. 43	43324-1
45	Bearing, for gear Fig. D	43347-1
46	Sector, only, for Fig. A	43319-1
47	Stud, for sector	38445 Gr 1
48	Counterweight, only, for Fig. B	43313
49	Stud, for counterweight	43342
50	Escutcheon Pin, No. 16 x 7/8″ for stud Fig. 49	28985
51	Bushing, for counterweight	43342
52	Washer, for stud Fig. 49	2534
53	Counterweight only, for Fig. C	43313-1
54	Gear only, for Fig. D	43311-2
55	Shaft, as shown	43345-1
56	Pinion, only	43321-2
57	Spring	51055
58	Washer, for spring Fig. 57	30077-1
59	Washer, fibre	36149-1
60	Sleeve, for shaft Fig. 55	51054
61	Pin, for sleeve	21873-1
62	Escapement Wheel, only	50924-1
63	Washer, fibre	34455-1
64	Washer, for use between fibre washer Fig. 63 and spring	23163
65	Spring, for sleeve Fig. 69	48340-1
66	Washer, for stud Fig. 76	6469-1

Model 2B Alternating Current Time Element Relays

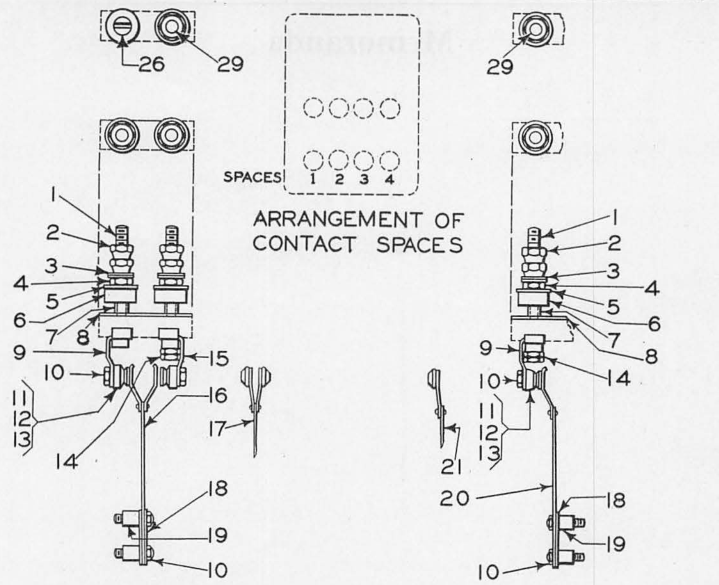
Detail Parts

Drawing references are shown for convenience in checking shipping lists and invoices.

Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
67	Ball, for ball race	36126-1
68	Taper Pin, for fastening escapement wheel to rotor shaft	34891-1
69	Sleeve, only	49699
70	Washer, fibre. Two required	34455
71	Washer, for use between fibre washer and spring	34454
72	Ball Race, only	49697
73	Ball Race, only	49698
74	Collar, for sleeve	40717-2
75	Stud, for fastening pawls to escapement wheel	50929-1
76	Stud, used as stop for pawls	50930-1
77	Pawl, only	50932-1
78	Rachet Wheel, only	50933-1
79	Pinion	36188-1
80	Screw, No. 10-32 x ½″ fill. hd., for washer Fig. 81. Includes shakeproof washer	12563-1 53029-3
81	Washer, for bearing Fig. 25	590-26
82	Bearing, for shaft Fig. 24. For use on relays of earlier design.	49696
83	Nut, ½″-24, hex., for bearing Fig. 82	43332
84	Bearing, for shaft Fig. 24. For use on relays of earlier design	43322-1
85	Bushing, for bearing Fig. 84	6714-59
86	Finger, for sector. For use on relays of earlier design. Includes escutcheon pin for attaching	43340 0738
87	Bearing, for gear Fig. D. For use on relays of earlier design	43346
88	Nut, 5⁄16″-24, hex., for bearing Fig. 87	43337
89	Bearing, for gear Fig. D. For use on relays of earlier design	43347

Memoranda

PLATE N0210


26
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SPACES 1 2 3 4
ARRANGEMENT OF CONTACT SPACES
1
2
3
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11
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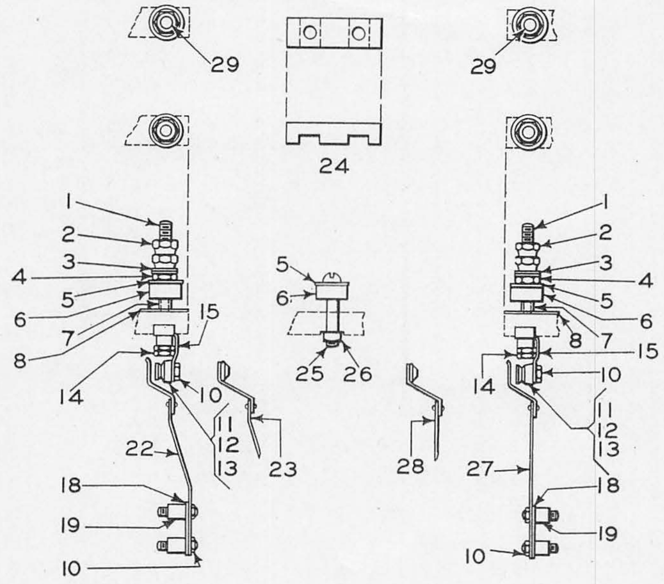
A - DEPENDENT FRONT AND BACK SPACES 1 AND 2 OR 3 AND 4

B - INDEPENDENT BACK SPACE 1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C - INDEPENDENT FRONT SPACE 2

D - INDEPENDENT FRONT SPACES 3 OR 4

Contact Groups for
Model 2B Time Element Relays

Contact Groups

for Model 2B Time Element Relays

Note. Terminal posts, etc., for all contact groups listed below have A. R. A. No. 14-24 threads. Relays have been furnished with ¼"-24 threads which must be specified if desired.

Contact groups are listed below with silver to carbon contacts, silver to silver contacts and graphite to graphite contacts.

Blocks Fig. 24 are not included with contact groups and must be ordered separately.

Drawing references are shown for convenience in checking shipping lists and invoices.

Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
A	Dependent Front and Back Contact Group Complete, for use in spaces 1 and 2 or 3 and 4. Includes contact finger, front and back posts, insulators, etc., as shown. Contacts are silver finger to carbon posts. (2-1, 6-2, 6-3, 3-4, 4-5, 4-6, 4-7, 2-8, 1-9, 4-10, 2-11, 2-14, 1-15, 1-16, 2-18, 2-19, 1-26, 1-29)..	43307 Gr 3
A1	as above, except contacts are silver finger to silver post. Parts same as in Fig. A except substitution of 2-12..........	
A2	same as Fig. A, except contacts are graphite finger to graphite post. Parts same as in Fig. A, except substitution of 2-13, 1-17..	
B	Independent Back Contact Group Complete, for use in space 1. Includes contact finger, contact post, insulators, etc., as shown. Contact is silver finger to carbon post. (1-1, 4-2, 4-3, 2-4, 2-5, 2-6, 2-7, 2-8, 1-9, 3-10, 1-11, 2-14, 1-18, 2-19, 1-20, 1-29)..	
B1	s above, except contact is silver finger to silver post. Parts same as in Fig. B except substitution of 1-12..........	
B2	same as Fig. B, except contact is graphite finger to graphite post. Parts same as in Fig. B, except substitution of 1-13, 1-21..	
C	Independent Front Contact Group Complete, for use in space 2. Includes contact finger, contact post, insulators, etc., as shown. Contact is silver finger to carbon post. (1-1, 4-2, 4-3, 2-4, 2-5, 2-6, 2-7, 2-8, 3-10, 1-11, 2-14, 1-15, 1-18, 2-19, 1-22, 1-29)..	

PLATE N0210

Contact Groups

for Model 2B Time Element Relays

Drawing references are shown for convenience in checking shipping lists and invoices.

Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
C1	as above, except contact is silver finger to silver post. Parts same as in Fig. B, except substitution of 1-12	
C2	same as Fig. C, except contact is graphite finger to graphite post. Parts same as in Fig. C, except substitution of 1-13, 1-23	
D	Independent Front Contact Group Complete, for use in spaces 3 or 4. Includes contact finger, contact post, insulators, etc., as shown. Contact is silver finger to carbon post. (1-1, 4-2, 4-3, 2-4, 2-5, 2-6, 2-7, 2-8, 3-10, 1-11, 2-14, 1-15, 1-18, 2-19, 1-27, 1-29)	
D1	as above, except contact is silver finger to silver post. Parts same as in Fig. D, except substitution of 1-12	
D2	same as Fig. D, except contact is graphite finger to graphite post. Parts same as in Fig. D, except substitution of 1-13, 1-28	
1	Terminal Post, No. 14-24 x 2 7/16″ sq. hd., for contact posts	48609-6
2	Nut, No. 14-24 hex., for terminal posts	42843-1
3	Washer, for terminal posts	1225-2
4	Nut, No. 14-24 hex., for terminal posts	42839-1
5	Washer, for bushings Fig. 6	45736-1
6	Insulating Bushing as shown for terminal posts	35287
7	Insulating Bushing, as shown, for terminal posts	35270
8	Washer, for use between blocks Fig. 24 and case	41790-1
9	Support, left hand, for contact posts	43330
10	Nut, No. 10-32, for contact posts and insulators	40795
11	Contact, carbon	34435 Gr 3
12	Contact, silver	
13	Contact, graphite	34435 Gr 1
14	Nut, No. 14-24, for terminal posts, Fig. 29	46989-2
15	Support, right hand, for contact posts	43331
16	Dependent front and back Contact Finger for use in spaces 1 and 2 or 3 and 4. Contacts are silver	43305 Gr 1

Contact Groups

Model 2B Time Element Relays

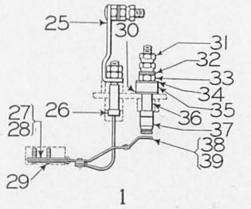
Drawing references are shown for convenience in checking shipping lists and invoices.

Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
17	Dependent front and back Contact Finger for use in spaces 1 and 2 or 3 and 4. Contacts are graphite	
18	Washer, for insulators Fig. 19	22543-1
19	Insulator, for mounting contact fingers to counterweight.	42792
20	Independent back Contact Finger for use in space 1. Contact is silver	43308 Gr 1
21	Independent back Contact Finger for use in space 1. Contact is graphite	
22	Independent front Contact Finger for use in space 2. Contact is silver	43308-2 Gr 1
23	Independent front Contact Finger for use in space 2. Contact is graphite	
24	Insulating Block, for terminal posts. Not included with contact groups complete	47508
25	Screw, No. 14-24, used as plug for blank spaces	0660-1
26	Nut, No. 14-24, for screw Fig. 25	42835
27	Independent front Contact Finger for use in spaces 3 or 4. Contact is silver	43308-1 Gr 1
28	Independent front Contact Finger for use in spaces 3 or 4. Contact is graphite	
29	Terminal Post, No. 14-24, for contact fingers	49455 Gr 1

Memoranda

Memoranda

PLATE N0214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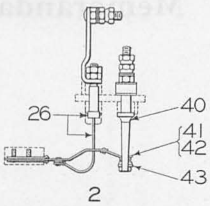
1

TWO POS. INDEPENDENT FRONT
THREE POS. INDEPENDENT NORMAL
ANY SPACE ON FOUR OR SIX WAY RELAY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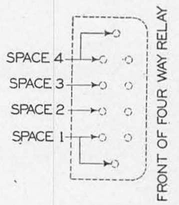
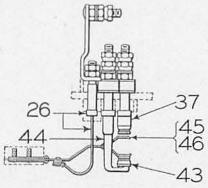
2

TWO POS. INDEPENDENT BACK
THREE POS. INDEPENDENT REVERSE
ANY SPACE ON FOUR OR SIX WAY RELAYS


SPACE 4
SPACE 3
SPACE 2
SPACE 1
FRONT OF FOUR WAY RELAY

ARRANGEMENT OF CONTACT SPACES
FOUR WAY RELAY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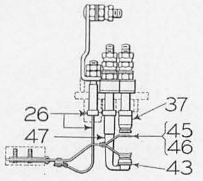
3

TWO POS. DEP. FRONT AND BACK
THREE POS. DEP. NORMAL AND REVERSE
SPACE 1 ON FOUR WAY RELAY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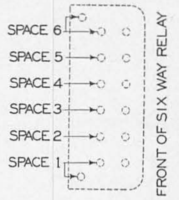
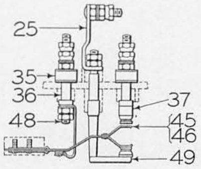
4

TWO POS. DEP. FRONT AND BACK
THREE POS. DEP. NORMAL AND REVERSE
SPACE 4 ON FOUR WAY RELAY


SPACE 6
SPACE 5
SPACE 4
SPACE 3
SPACE 2
SPACE 1
FRONT OF SIX WAY RELAY

ARRANGEMENT OF CONTACT SPACES
SIX WAY RELAY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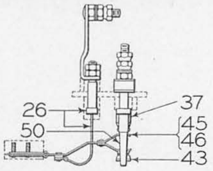
5

TWO POS. DEP. FRONT AND BACK
THREE POS. DEP. NORMAL AND REVERSE
SPACES 1 AND 6 ON SIX WAY RELAY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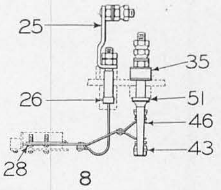
7

TWO POS. DEP. FRONT AND BACK
THREE POS. DEP. NORMAL AND REVERSE
SPACES 2&3 ON FOUR WAY RELAY
SPACES 2&3 OR 3&4 OR 4&5 ON
SIX WAY RELAYS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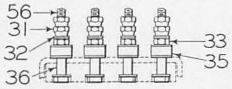
8

ENERGIZED CONTACT
ANY SPACE ON FOUR OR SIX WAY
THREE POS. RELAYS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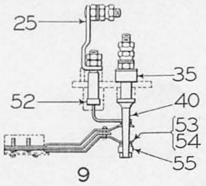
10

TERMINAL POSTS FOR STATOR WINDINGS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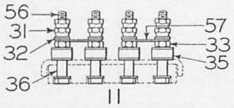
9

DE-ENERGIZED CONTACT FOR THREE POS. RELAY
BELL RINGING CONTACT FOR TWO POS. RELAY
ANY SPACE ON FOUR OR SIX WAY RELAYS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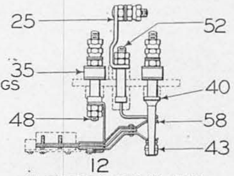
11

TERMINAL POSTS WITH CONNECTORS FOR STATOR WINDINGS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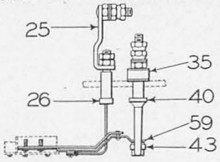
12

THREE POS. NORMAL AND
DE-ENERGIZED TO REVERSE
SPACES 1 OR 4 ON FOUR WAY RELAY
SPACES 1 OR 6 ON SIX WAY RELAY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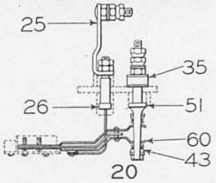
19

THREE POS. INDEPENDENT DE-ENERGIZED TO REVERSE
ANY SPACE ON FOUR OR SIX WAY RELAYS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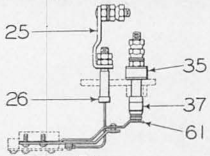
20

THREE POS. ENERGIZED CONTACT
ANY SPACE ON FOUR OR SIX WAY RELAYS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37
61

21

THREE POS. IND. DE-ENERGIZED
TO NORMAL
ANY SPACES ON FOUR OR SIX WAY RELAYS

Contact Groups for Model 2B Relays

Contact Groups

for Model 2B Relays

Note. Contact posts, terminal posts, etc., for all contact groups listed below have A. R. A. standard No. 14-24 threads. Relays have been furnished with ¼″-24 threads, which must be specified, if desired.

When ordering contact groups, always specify whether desired for two or three-position relays. If special contact adjustment is desired or if contacts are to be used for ringing bells fed from low voltage batteries, same must be specified.

Contact groups as listed below are furnished with silver to carbon contacts with the exception of group Fig. 9 which is furnished with silver to silver contacts and group Fig. 12 which is furnished with silver to silver front contacts.

Contact groups are designated, front and back for two-position relays (Fig. A), normal and reverse for three-position relays (Fig. B).

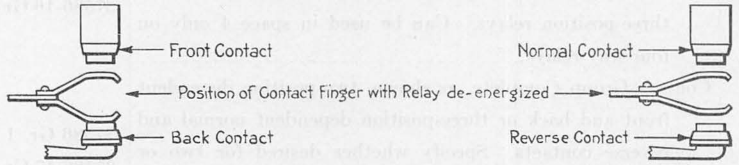


FIG. A
Contacts for Two Position Relay

FIG. B
Contacts for Three Position Relay

Front contacts are made when the relay is energized, back contacts are made when the relay is de-energized. Normal and reverse contacts are made when the relay is energized, the normal and reverse positions being dependent upon the polarity of the current applied to one of the two phases.

Drawing references are shown for convenience in checking shipping lists and invoices.

Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
1	Contact Group Complete, as shown, two-position independent	37586-6 Gr 1
	front or three-position independent normal contact.	37586-7 Gr 1
	Specify whether desired for two or three position relay.	37586-27 Gr 1
	Can be used in any space on four or six-way relays......	37586-28 Gr 1
2	Contact Group Complete, as shown, two-position independent	37586-8 Gr 1
	back or three-position independent reverse contact.	37586-9 Gr 1
	Specify whether desired for two or three-position relay.	37586-31 Gr 1
	Can be used in any space on four or six-way relays.....	37586-32 Gr 1

PLATE N0214

General Railway Signal Company February 1929

Contact Groups

for Model 2B Relays

Drawing references are shown for convenience in checking shipping lists and invoices.

Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
3	Contact Group Complete, as shown, two-position dependent front and back or three-position dependent normal and reverse contacts. Specify whether desired for two or three-position relay. Can be used in space 1 only on four-way relays..........	37586-2 Gr 1 37586-15 Gr 1
4	Contact Group Complete, as shown, two-position dependent front and back or three-position dependent normal and reverse contacts. Specify whether desired for two or three-position relays. Can be used in space 4 only on four-way relays..........	37586-3 Gr 1 37586-16 Gr 1
5	Contact Group Complete, as shown, two-position dependent front and back or three-position dependent normal and reverse contacts. Specify whether desired for two or three-position relays. Can be used in spaces 1 and 6 on six-way relays..........	37586 Gr. 1 37586-17 Gr 1
7	Contact Group Complete, as shown, two-position dependent front and back or three-position dependent normal and reverse contacts. Specify whether desired for two or three-position relays. Can be used in spaces 2 and 3 on four-way relays or in spaces 2 and 3, or 3 and 4, or 4 and 5 on six-way relays..........	37586-1 Gr 1 37586-18 Gr 1
8	Contact Group Complete, as shown, energized contact for use on three-position relays only Circuit is made when relay is energized in either the normal or reverse positions and broken when relay is de-energized. Can be used in any space on four or six-way relays..........	37586-19 Gr 1 37586-20 Gr 1

Contact Groups

for Model 2B Relays

Drawing references are shown for convenience in checking shipping lists and invoices.

Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
9	Contact Group Complete, as shown, de-energized contact for three-position relays and bell-ringing contact for two-position relays. When used as a de-energized contact the circuit is made when relay is de-energized and broken when relay is energized in either the normal or reverse positions. When used as a bell-ringing contact the circuit is made momentarily while the contacts are operating from either front to back or back to front positions. Can be used in any space on the four or six-way relays......	37586-4 Gr 1 37586-5 Gr 1 37586-21 Gr 1 37586-22 Gr 1
10	Terminal Posts Complete, as shown, for stator windings on two circuit relays with local and line or local and track windings..	37586-46 Gr 1
11	Terminal Posts Complete, as shown, with two connectors, for stator windings on two element relays when used as single circuit relays..	37586-46 Gr 3
12	Contact Group Complete, as shown, dependent normal and de-energized to reverse contact. Reverse contact is opened with relay in normal position only. For use on three-position relays. Can be used in spaces 1 or 4 on four-way relays and 1 or 6 on six-way relays...........	37586-23 Gr 1 37586-24 Gr 1
19	Contact Group Complete, as shown, independent de-energized to reverse contact. Contact is opened with relay in normal position only. For use on three-position relays. Can be used in any space on four or six-way relays......	37586-33 Gr 1 37586-34 Gr 1
20	Contact Group Complete, as shown, energized contact having small contact opening, for use on three-position relays only. Circuit is made when relay is energized in either the normal or reverse positions and broken when relay is de-energized. Can be used in any space on four or six-way relays..	37586-25 Gr 1 37586-26 Gr 1
21	Contact Group Complete, as shown, independent de-energized to normal contact. Contact is opened with relay in reverse position only. For use on three-position relays. Can be used in any space on four or six-way relays.......	37586-29 Gr 1 37586-30 Gr 1

PLATE N0214

Contact Groups

for Model 2B Relays

Drawing references are shown for convenience in checking shipping lists and invoices.

Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
25	Binding Post, includes No. 14-24 stud	46712 Gr 1
26	Terminal Post, No. 14-24, includes wire and eyelet for connecting to contact finger	42500 Gr 3
27	Adjuster, for contact fingers	41587-1
28	Washer, for contact fingers on three-position relays	2534-1
29	Screw, No. 8-32 x 7/16″ rd. hd., for fastening contact finger to block	20638-1
30	Washer, for use under insulators	1533-9
31	Nut, No. 14-24 hex., for terminal posts	42843-1
32	Washer, for terminal posts	1225-2
33	Nut, No. 14-24 hex., for terminal posts	42839-1
34	Washer, for insulators	45736-1
35	Insulating Bushing, for terminal posts	35287
36	Insulating Bushing, for terminal posts	35270
37	Front Contact Post, No. 14-24, includes carbon contact	49456-2 Gr 1
38	Contact Finger Complete, independent front silver contact, for two position relays	41565 Gr 1
39	Contact Finger Complete, independent normal silver contact for three-position relays	41565 Gr 3
40	Contact Yoke, No. 14-24 threads, for contact groups, Figs. 2, 9, 12 and 19	37474-1 Gr 1
41	Contact Finger Complete, independent back silver contact, for two-position relays	41563 Gr 1
42	Contact Finger Complete, independent reverse silver contact for three-position relays	41563 Gr 3
43	Contact, carbon	34435 Gr 3
44	Contact Arm, No. 14-24, left hand, for contact group Fig. 3	37394-1 Gr 1
45	Contact Finger Complete, dependent front and back silver contacts, for two-position relays	41564 Gr 1
46	Contact Finger Complete, dependent normal and reverse silver contact, for three-position relay	41564 Gr 3
47	Contact Arm, No. 14-24, right hand, for contact group Fig. 4	37394-2 Gr 1
48	Terminal Post, No. 14-24 threads	49455 Gr 17

Contact Groups

for Model 2B Relays

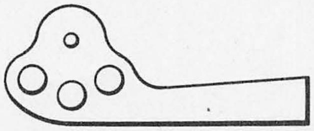
Drawing references are shown for convenience in checking shipping lists and invoices.

Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
49	Contact Arm, No. 14-24, for contact group Fig. 5	42502 Gr 1
50	Contact Arm, No. 14-24, for contact group Fig. 7	37394-3 Gr 1
51	Contact Yoke, No. 14-24 threads, for contact groups Figs. 8 and 20	37691 Gr 1
52	Contact Posts, No. 14-24, includes silver contact, for contact groups Figs. 9 and 12	42665 Gr 4
53	Contact Finger Complete, de-energized silver contact, for three-position relays	41979 Gr 2
54	Contact Finger Complete, bell-ringing contact, for two-position relays	41979 Gr 2
55	Contact, silver	37446 Gr 2
56	Terminal Posts, No. 14-24, for groups Figs. 10 and 11	48609-11
57	Connector, for terminal posts	29288-1
58	Contact Finger Complete, dependent normal and de-energized to reverse silver contact, for three-position relays	41979 Gr 3
59	Contact Finger Complete, de-energized to reverse silver contact, for three-position relays	41979-1 Gr 3
60	Contact Finger Complete, energized silver contact, arranged to give small contact opening for group Fig. 20. For three-position relay	41979 Gr 4
61	Contact Finger Complete, independent de-energized to normal silver contact, for three-position relays	41565-2 Gr 1

Memoranda

Memoranda

PLATE NO 215



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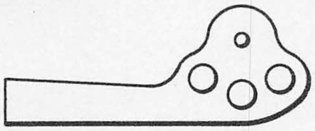

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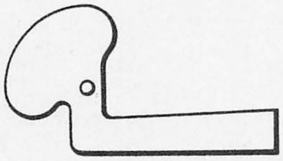

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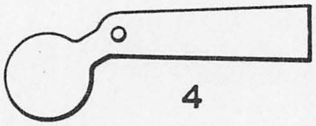

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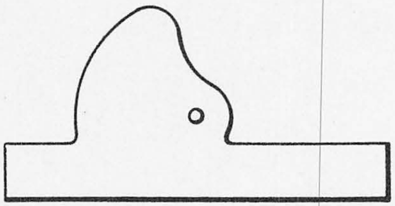

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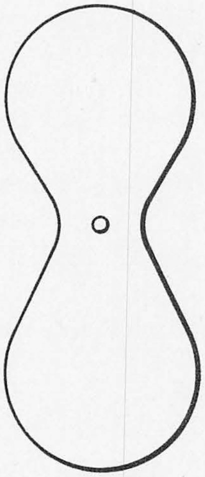

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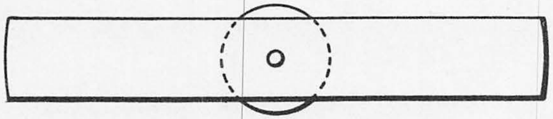


7

Blades for Model 2B Indicating Relays,
Switch and Tower Indicators

Blades

For Model 2B Indicating Relays, Switch and Tower Indicators

Note: When ordering blades, always specify color and striping.

Drawing references are shown for convenience in checking shipping lists and invoices.

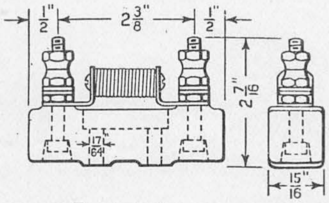
Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
1	Blade, right hand upper quadrant	
2	Blade, left hand upper quadrant	
3	Blade, right hand upper quadrant	
4	Blade, right hand lower quadrant	
5	Blade, right hand lower quadrant	
6	Disc	
7	Blade, center suspended	

Memoranda

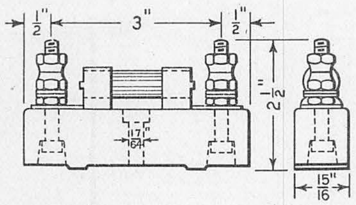
Section N, Part 13

Resistors and Reactors

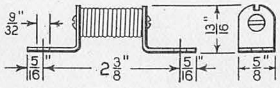
Resist-
ors
React-
ors
13


1/2"
2 3/8"
1/2"
2 7/16"
17/64
15/16"

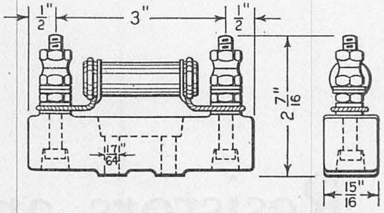
B – MOUNTED RESISTOR


1/2"
3"
1/2"
2 1/2"
17/64
15/16"

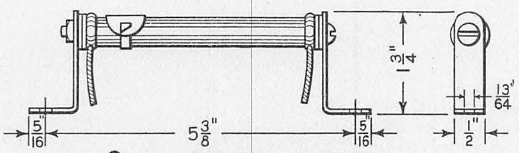
D – MOUNTED RESISTOR


9/32"
13/16"
5/16"
2 3/8"
5/16"
5/8"

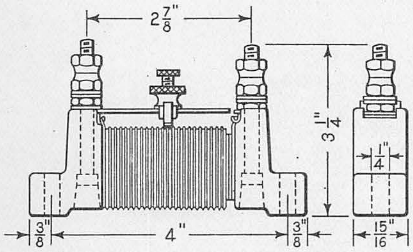
C – MOUNTED RESISTOR


1/2"
3"
1/2"
2 7/16"
17/64
15/16"

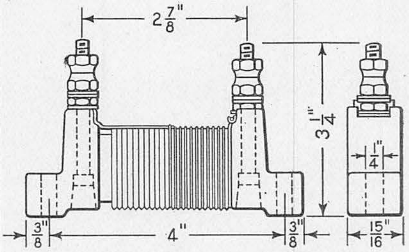
E – MOUNTED TYPE A RESISTOR
F – MOUNTED TYPE O RESISTOR


1 3/4"
13/64
5/16
5 3/8"
5/16
1/2"

G – MOUNTED TYPE S RESISTOR


2 7/8"
3 1/4"
1/4"
3/8"
4"
3/8"
15/16"

H – TYPE L ADJUSTABLE RESISTOR


2 7/8"
3 1/4"
1/4"
3/8"
4"
3/8"
15/16"

J – TYPE L FIXED RESISTOR

Mounted Resistors

Mounted Resistors

Note: Continuous capacities as given for resistors are such as will allow a temperature rise of approximately 75° C and are much lower than those usually given for resistors of similar dimensions. For intermittent service they may be used at correspondingly higher capacities. These resistors are subject to a variation in resistance of 10 per cent above and below the rated resistances. See Plate N1306 for unmounted resistors.

When ordering resistors it is desirable to specify the maximum current to be carried through the full resistance.

Order by plate, figure number and name

Mounted Resistors

Mounted on R. S. A. Porcelain Terminal Block			Mounted on Brackets			Mounted on Porcelain Terminal Block		
Fig. No.	Ohms	Continuous Capacity	Fig. No.	Ohms	Continuous Capacity	Fig. No.	Ohms	Continuous Capacity
B	0.25	6 Watts	C	0.25	6 Watts	**D**	See Note below	
B 1	0.50	6 Watts	C 1	0.50	6 Watts			
B 2	0.75	6 Watts	C 2	0.75	6 Watts			
B 3	1.00	6 Watts	C 3	1.00	6 Watts			

Note: Fig. D consists of a graphite resistance rod mounted on a porcelain block with terminal posts as shown. This resistor is for use in connection with Model 1B Lightning Arrestor (Plate N1401) when used on alternating-current circuits of voltages from 40 to 220. One resistor is required for each arrestor for use in the ground lead.

Continued on following page

Mounted Resistors

Order by plate, figure number and name

Mounted Resistors—Table of Standard Resistances

Type A				Type O		Type S	
Mounted on Porcelain Terminal Block Continuous Capacity 9 Watts				Mounted on Porcelain Terminal Block Continuous Capacity 6 Watts		Mounted on Brackets Continuous Capacity 12 Watts	
Fig.No.	Ohms	Fig.No.	Ohms	Fig. No.	Ohms	Fig. No.	Ohms
E	0.2	E 11	10	F	400	G	700
E 1	0.3	E 12	15	F 1	500	G 1	1000
E 2	0.4	E 13	22	F 2	600	G 2	1500
E 3	0.6	E 14	31	F 3	700	G 3	2000
E 4	0.9	E 15	45	F 4	800	G 4	2500
E 5	1.2	E 16	62	F 5	1000	G 5	3000
E 6	1.7	E 17	90			G 6	3500
E 7	2.5	E 18	125			G 7	4000
E 8	3.5	E 19	175				
E 9	5	E 20	250				
E 10	7	E 21	350				

See Plate N1306 for unmounted Types A, O and S Resistors.

Mounted Resistors

Order by plate, figure number and name

Type L Adjustable and Fixed Resistors

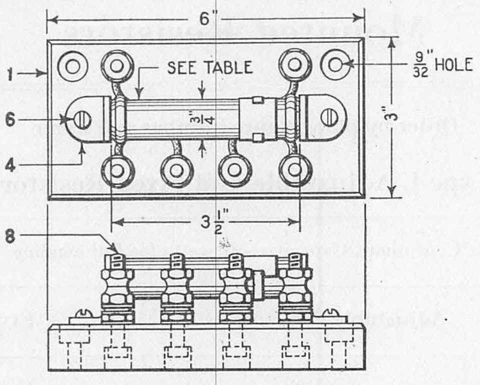
Continuous Capacity—21 watts for full winding

Adjustable Resistors		Fixed Resistors	
Fig. No.	Ohms	Fig. No.	Ohms
H	0.2 to 1.2 in steps of 0.05 ohm	J	0.3
H 1	0.4 to 2.0 in steps of 0.1 ohm	J 1	0.4
H 2	0.5 to 2.0 in steps of 0.1 ohm	J 2	0.5
H 3	1.5 to 3.0 in steps of 0.15 ohm	J 3	0.6
H 4	0.05 to 1.8 in steps of 0.05 ohm—See Note	J 4	0.7
H 5	0.02 to 4 in steps of 0.1 ohm—See Note	J 5	0.8
H 6	0.52 to 12 in steps of 0.26 ohm—See Note	J 6	1.0
		J 7	1.3

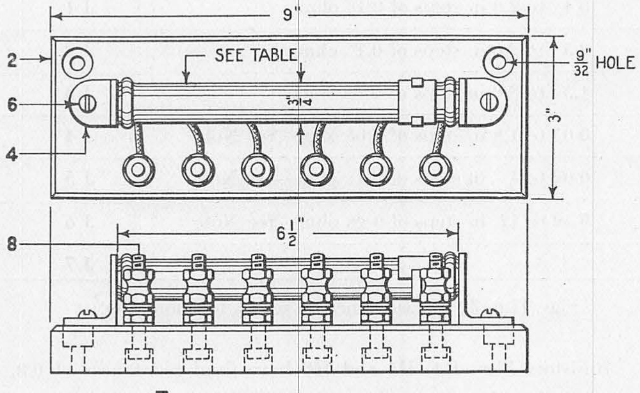
Figs. H to J7 inclusive include screws for mounting.

Note: Resistors Figs. H4, H5 and H6 have fixed resistances of 0.9, 2.0 and 7.0 ohms respectively. If resistance less than that of the fixed winding is required the slotted bar on which the adjustable contact is mounted should be fastened to the binding post on the end of the resistor adjacent to the fixed winding. If resistance greater than that of the fixed winding is required the slotted bar should be fastened to the binding post on the end opposite the fixed winding.

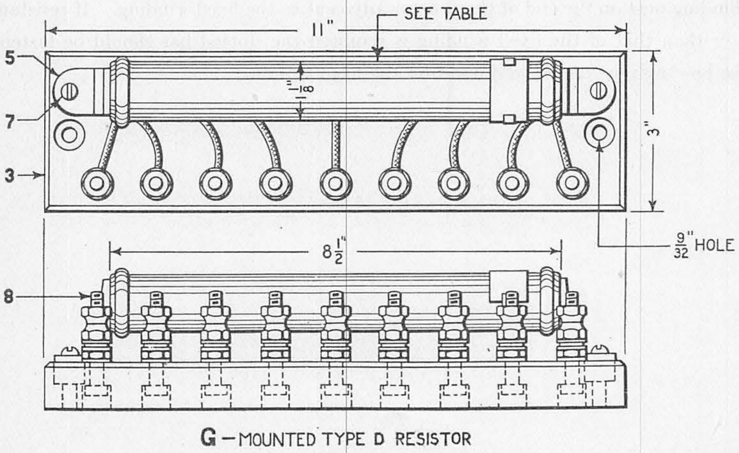
PLATE N1303


6"
1
6
4
SEE TABLE
3/4"
9/32" HOLE
3"
3 1/2"
8

E - MOUNTED TYPE B RESISTOR


9"
2
6
4
SEE TABLE
3/4"
9/32" HOLE
3"
6 1/2"
8

F - MOUNTED TYPE C RESISTOR


SEE TABLE
11"
5
7
3
1 1/8"
3"
9/32" HOLE
8 1/2"
8

G - MOUNTED TYPE D RESISTOR

Mounted Resistors

Mounted Resistors

Note: Continuous capacities as given for resistors are such as will allow a temperature rise of approximately 75° C and are much lower than those usually given for resistors of similar dimensions. For intermittent service they may be used at correspondingly higher capacities. These resistors are subject to a variation in resistance of 10 per cent above and below the rated resistances. See Plate N1306 for unmounted resistors.

Taps are not included with resistors unless specified. An additional charge is made for each tap. When taps are desired give total resistance, number of taps and resistance at each tap. Note: Types B and C Resistors are shown with four taps and Type D with seven taps.

When ordering resistors it is desirable to specify the maximum current to be carried through the full resistance.

Order by plate, figure number and name

Resistors—Mounted on Wooden Terminal Blocks
Table of Standard Resistances

Type B		Type C		Type D	
Continuous Capacity 14 Watts		Continuous Capacity 26 Watts		Continuous Capacity 42 Watts	
Fig. No.	Ohms	Fig. No.	Ohms	Fig. No.	Ohms
E	0.2	F	0.15	G	0.15
E 1	0.3	F 1	0.2	G 1	0.2
E 2	0.4	F 2	0.3	G 2	0.3
E 3	0.6	F 3	0.4	G 3	0.4
E 4	0.9	F 4	0.6	G 4	0.6
E 5	1.2	F 5	0.9	G 5	0.9
E 6	1.7	F 6	1.2	G 6	1.2
E 7	2.5	F 7	1.7	G 7	1.7
E 8	3.5	F 8	2.5	G 8	2.5

Continued on following page

Mounted Resistors

Order by plate, figure number and name

Resistors—Mounted on Wooden Terminal Blocks
Table of Standard Resistances

Type B		Type C		Type D	
Continuous Capacity 14 Watts		Continuous Capacity 26 Watts		Continuous Capacity 42 Watts	
Fig. No.	Ohms	Fig. No.	Ohms	Fig. No.	Ohms
E 9	5	F 9	3.5	G 9	3.5
E 10	7	F 10	5	G 10	5
E 11	10	F 11	7	G 11	7
E 12	15	F 12	10	G 12	10
E 13	22	F 13	15	G 13	15
E 14	31	F 14	22	G 14	22
E 15	45	F 15	31	G 15	31
E 16	62	F 16	45	G 16	45
E 17	90	F 17	62	G 17	62
E 18	125	F 18	90	G 18	90
E 19	175	F 19	125	G 19	125
E 20	250	F 20	175	G 20	175
E 21	350	F 21	250	G 21	250
E 22	500	F 22	350	G 22	350
E 23	700	F 23	500	G 23	500
		F 24	700	G 24	700
		F 25	1000	G 25	1000
				G 26	1500
				G 27	2000

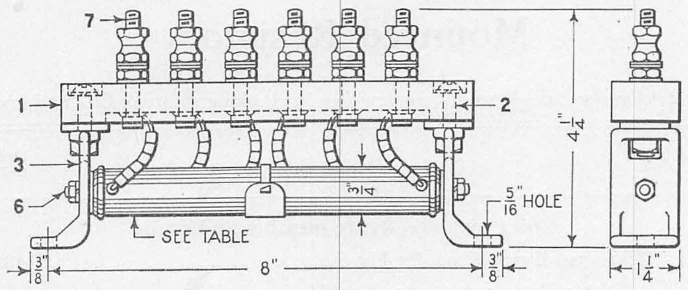
See Plate N1306 for unmounted Types B, C and D Resistors.

Mounted Resistors

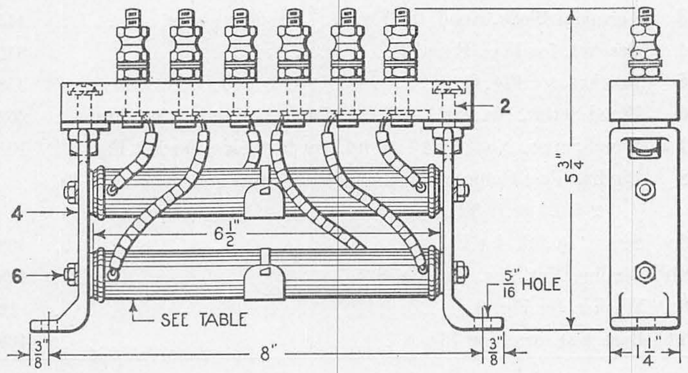
Drawing references are shown for convenience in checking shipping lists and invoices,

Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
1	Terminal Block, wood, for Fig. E.	43287
	Note: When ordering terminal blocks specify number of taps on resistor to be mounted so that proper drilling may be furnished.	
2	Terminal Block, wood, for Fig. F. See note above	43379
3	Terminal Block, wood, for Fig. G. See note above	44599
4	Bracket, for Figs. E and F.	34369
5	Bracket, for Fig. G.	35837
6	Wood Screw, No. 8 x $\frac{3}{4}''$ rd. hd., for fastening bracket Fig. 4.	26514
7	Wood Screw, No. 14 x 1″ rd. hd., for fastening bracket Fig. 5.	19538
8	Binding Post Complete, includes screw, nuts and washers (1-8a, 2-8b, 3-8c, 1-8d)	
8a	Screw, sq. hd., for Fig. 8.	50874
8b	Binding Nut, hex., for Fig. 8.	42843
8c	Washer, for Fig. 8.	1225
8d	Base Nut, hex., for Fig. 8.	46989

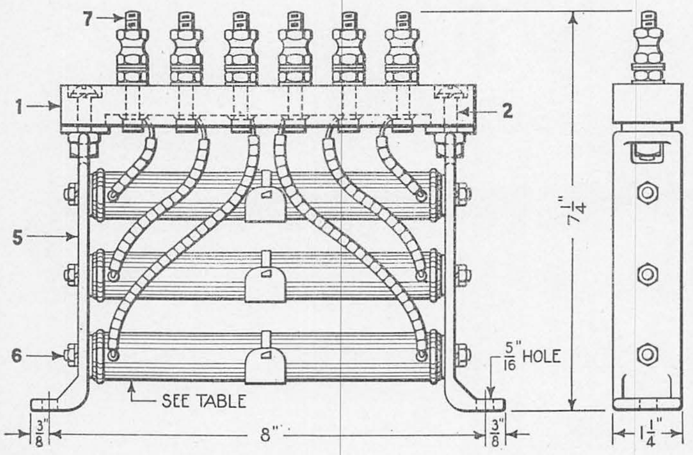
PLATE N1305


7
1
3
6
2
4¼"
¾
5/16" HOLE
SEE TABLE
3/8"
8"
3/8"
1¼"

D - MOUNTED TYPE C RESISTOR - ONE WAY


2
4
6
5¾"
6½"
5/16" HOLE
SEE TABLE
3/8"
8"
3/8"
1¼"

E - MOUNTED TYPE C RESISTOR - TWO WAY


7
1
2
5
6
7¼"
5/16" HOLE
SEE TABLE
3/8"
8"
3/8"
1¼"

F—Mounted Type C Resistor—Three Way

Mounted Resistors

Mounted Resistors

Note: Continuous capacity as given for resistors is such as will allow a temperature rise of approximately 75° C. This capacity is much lower than that usually given for resistors of similar dimensions. For intermittent service they may be used at correspondingly higher capacities. These resistors are subject to a variation in resistance of 10 per cent above and below the rated resistances. See Plate N1306 for unmounted resistors.

Taps are not included with resistors unless specified. An additional charge is made for each tap.

When ordering Resistors always give the following specifications:

a—Total resistance for each unit. See table below for standard resistances.

b—When taps are desired, give for each unit the total resistance, number of taps and resistance at each tap. Note: Fig. D may have four taps and Fig. E two taps.

It is also desirable to specify the maximum current to be carried through the full resistance.

Type C Resistors—Table of Standard Resistances

Continuous Capacity—26 Watts						
Ohms						
0.15	0.6	2.5	10	45	175	700
0.2	0.9	3.5	15	62	250	1000
0.3	1.2	5	22	90	350	
0.4	1.7	7	31	125	500	

Drawing references are shown for convenience in checking shipping lists and invoices.

Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
D	One Type C Resistor, mounted on brackets with porcelain terminal block. Give specifications above	50082
E	Two Type C Resistors, mounted on brackets with porcelain terminal block. Give specifications above	
F	Three Type C Resistors, mounted on brackets with porcelain terminal block. Give specifications above	
1	Terminal Block, porcelain	50086

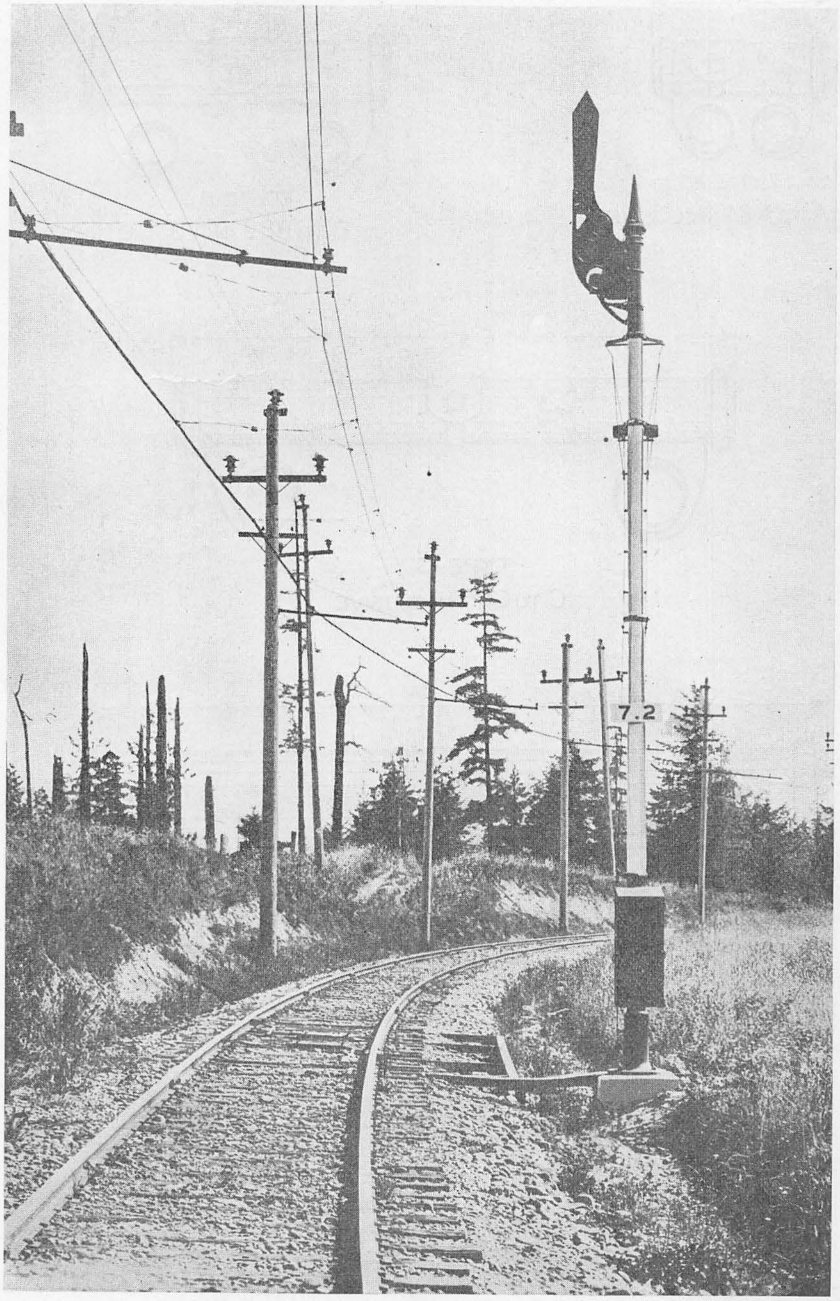
PLATE N1305

General Railway Signal Company May 1917

Mounted Resistors

Drawing references are shown for convenience in checking shipping lists and invoices.

Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
2	Screw Complete, includes nut, lock washer and felt washer, for fastening terminal block Fig. 1 to bracket (1-2a, 1-2b, 1-2c, 1-2e)	
2a	Screw only, rd. hd., for Fig. 2	0516
2b	Nut, square, for Fig. 2	50597
2c	Lock Washer, for Fig. 2	0510
2d	Felt Washer, for Fig. 2	9360
3	Bracket, for Fig. D	50083
4	Bracket, for Fig. E	50084
5	Bracket, for Fig. F	50085
6	Stud Complete, includes nuts, lock washers and fibre washer, for supporting resistors (1-6a, 2-6b, 2-6c, 2-6d)	
6a	Stud only, $\frac{3}{16}''$ x $7\frac{1}{2}''$, threaded on both ends, for Fig. 6	50087
6b	Nut, No. 10 hex., for Fig. 6	38239
6c	Lock Washer, for Fig. 6	0622
6d	Fibre Washer, used between bracket and resistor	7240
7	Binding Post Complete, includes screw, nuts and washers (1-7a, 2-7b, 1-7c, 3-7d, 4-7e)	
7a	Screw, sq. hd., for Fig. 7	50007
7b	Binding Nut, hex., for Fig. 7	42843
7c	Base Nut, hex., for Fig. 7	46989
7d	Washer, for Fig. 7	1225
7e	Paper Washer, for Fig. 7	29728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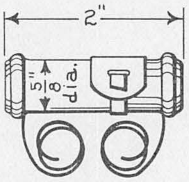
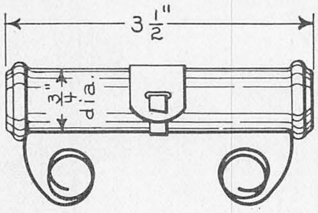
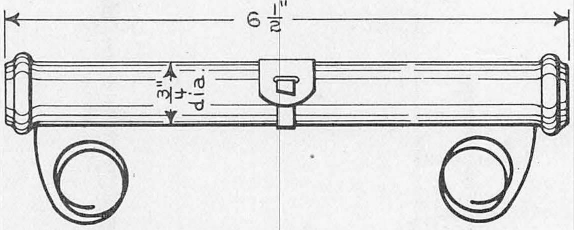


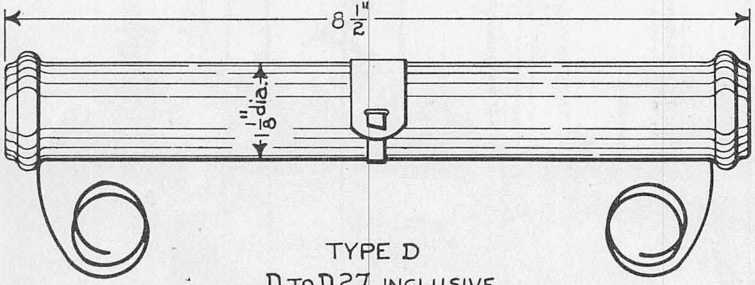
TYPE A
A TO A21 INCLUSIVE



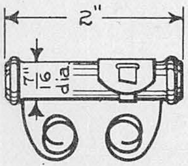
TYPE B
B TO B23 INCLUSIVE



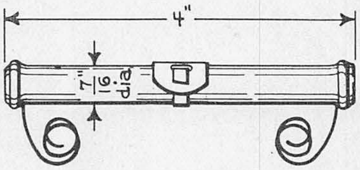
TYPE C
C TO C25 INCLUSIVE



TYPE D
D TO D27 INCLUSIVE



TYPE O
E TO E5 INCLUSIVE



TYPE S
F TO F7 INCLUSIVE

Unmounted Resistors

Unmounted Resistors

Note: Continuous capacities as given for resistors are such as will allow a temperature rise of approximately 75° C and are much lower than those usually given for resistors of similar dimensions. For intermittent service they may be used at correspondingly higher capacities. These resistors are subject to a variation in resistance of 10 per cent above and below the rated resistances. See Plates N1301, N1303 and N1305 for mounted resistors.

Taps are not included with resistors unless specified. An additional charge is made for each tap. When taps are desired give total resistance, number of taps and resistance at each tap.

When ordering resistors it is desirable to specify the maximum current to be carried through the full resistance.

Order by plate, figure number and name

Unmounted Resistors—Table of Standard Resistances.

Type A		Type B		Type C	
Continuous Capacity 9 Watts		Continuous Capacity 14 Watts		Continuous Capacity 26 Watts	
Fig. No.	Ohms	Fig. No.	Ohms	Fig. No.	Ohms
A	0.2	B	0.2	C	0.15
A 1	0.3	B 1	0.3	C 1	0.2
A 2	0.4	B 2	0.4	C 2	0.3
A 3	0.6	B 3	0.6	C 3	0.4
A 4	0.9	B 4	0.9	C 4	0.6
A 5	1.2	B 5	1.2	C 5	0.9
A 6	1.7	B 6	1.7	C 6	1.2
A 7	2.5	B 7	2.5	C 7	1.7
A 8	3.5	B 8	3.5	C 8	2.5

Continued on following page

PLATE N1306

General Railway Signal Company May 1917

Unmounted Resistors

Order by plate, figure number and name

Unmounted Resistors—Table of Standard Resistances.

Type A		Type B		Type C	
Continuous Capacity 9 Watts		Continuous Capacity 14 Watts		Continuous Capacity 26 Watts	
Fig. No.	Ohms	Fig. No.	Ohms	Fig. No.	Ohms
A 9	5	**B 9**	5	**C 9**	3.5
A 10	7	**B 10**	7	**C 10**	5
A 11	10	**B 11**	10	**C 11**	7
A 12	15	**B 12**	15	**C 12**	10
A 13	22	**B 13**	22	**C 13**	15
A 14	31	**B 14**	31	**C 14**	22
A 15	45	**B 15**	45	**C 15**	31
A 16	62	**B 16**	62	**C 16**	45
A 17	90	**B 17**	90	**C 17**	62
A 18	125	**B 18**	125	**C 18**	90
A 19	175	**B 19**	175	**C 19**	125
A 20	250	**B 20**	250	**C 20**	175
A 21	350	**B 21**	350	**C 21**	250
		B 22	500	**C 22**	350
		B 23	700	**C 23**	500
				C 24	700
				C 25	1000

See Plates N1301, N1303 and N1305 for mounted resistors.

Unmounted Resistors

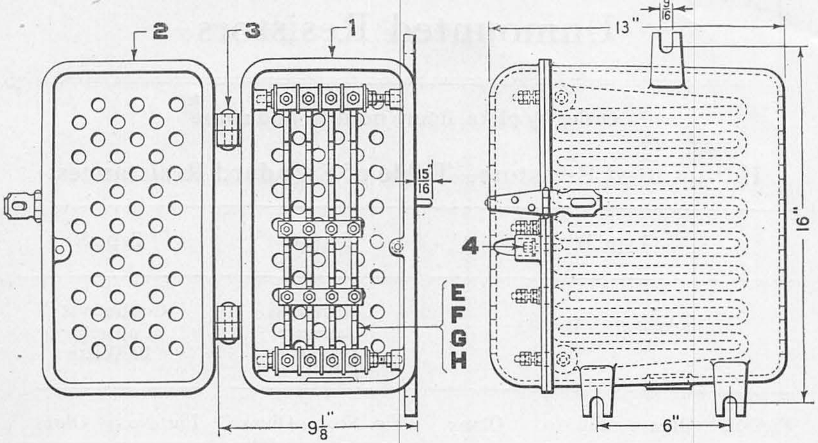
Order by plate, figure number and name

Unmounted Resistors—Table of Standard Resistances.

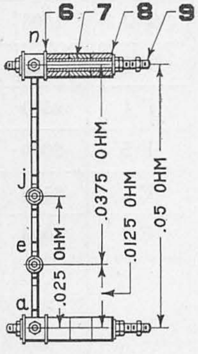
Type D				Type O		Type S	
Continuous Capacity 42 Watts				Continuous Capacity 6 Watts		Continuous Capacity 12 Watts	
Fig.No.	Ohms	Fig.No.	Ohms	Fig. No.	Ohms	Fig. No.	Ohms
D	0.15	D 14	22	E	400	F	700
D 1	0.2	D 15	31	E 1	500	F 1	1000
D 2	0.3	D 16	45	E 2	600	F 2	1500
D 3	0.4	D 17	62	E 3	700	F 3	2000
D 5	0.9	D 19	125	E 5	1000	F 4	2500
D 6	1.2	D 20	175			F 5	3000
D 7	1.7	D 21	250			F 6	3500
D 8	2.5	D 22	350			F 7	4000
D 9	3.5	D 23	500				
D 10	5	D 24	700				
D 11	7	D 25	1000				
D 12	10	D 26	1500				
D 13	15	D 27	2000				

See Plates N1301, N1303 and N1305 for mounted resistors.

PLATE N1307

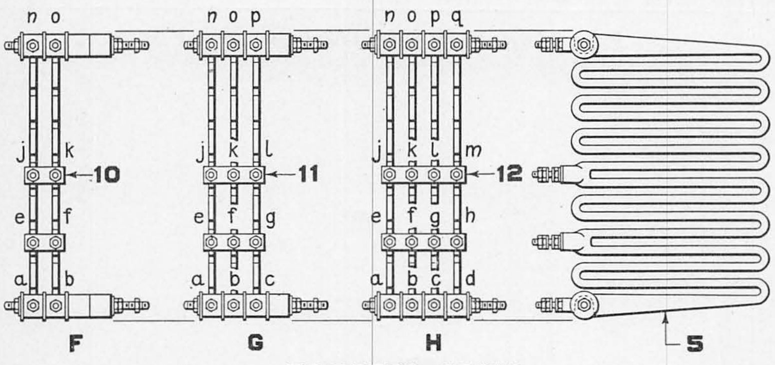

2
3
1
15/16
9 1/8"
13"
9/16"
16"
4
6"
E
F
G
H

RESISTOR GRIDS COMPLETE WITH CASE – SEE TABLE


6
7
8
9
n
j
e
a
.0375 OHM
.0125 OHM
.05 OHM
.025 OHM

E

FIG.	GRID	RESIS.	ATTACH LEADS TO POSTS	CONNECT POSTS	NO. OF TAPS
A	FIG. E	.0125	a – e		
	”	.0250	a – j		1
	”	.0375	e – n		1
	”	.0500	a – n		2
B	FIG. F	.0625	n – f	a – b	3
	”	.0750	n – k	a – b	4
	”	.0875	a – f	n – o	4
	”	.1000	a – b	n – o	5
C	FIG. G	.1125	a – g	n – o, b – c	6
	”	.1250	a – l	n – o, b – c	7
	”	.1375	n – g	a – b, o – p	7
	”	.1500	a – p	n – o, b – c	8
D	FIG. H	.1625	n – h	a-b, o-p, c-d	9
	”	.1750	n – m	a-b, o-p, c-d	10
	”	.1875	a – h	n-o, b-c, p-q	10
	”	.2000	n – q	a-b, o-p, c-d	11


n o
j k
10
e f
a b
n o p
j k l
11
e f g
a b c
n o p q
j k l m
12
e f g h
a b c d
5

F G H

RESISTOR GRIDS

Resistor Grids

Note: See table on opposite page for the various resistances obtainable from the resistor grids as listed below. Continuous capacities are as follows: Fig. E, 75 watts, Fig. F, 150 watts, Fig. G, 225 watts and Fig. H, 300 watts. These capacities are such as will allow a temperature rise of approximately 75°C and are much lower than those usually given for grids of similar design. For intermittent service they may be used at correspondingly higher capacities. These grids are subject to a variation of 10 per cent above and below the rated resistances.

When ordering, it is desirable to specify the maximum current to be carried through full resistance.

Drawing references are shown for convenience in checking shipping lists and invoices.

Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
A	Resistor Grid Fig. E Complete with case, arranged for padlock fastening. (1-E, 1-1a)	
A1	as above, except arranged for screw-lock fastening. (1-E, 1-1c)	
B	Resistor Grid Fig. F Complete with case, arranged for padlock fastening. (1-F, 1-1a)	
B1	as above, except arranged for screw-lock fastening. (1-F, 1-1c).	
C	Resistor Grid Fig. G Complete with case, arranged for padlock fastening. (1-G, 1-1a)	
C1	as above, except arranged for screw-lock fastening. (1-G, 1-1c)	
D	Resistor Grid Fig. H Complete with case, arranged for padlock fastening. (1-H, 1-1a)	
D1	as above, except arranged for screw-lock fastening. (1-H, 1-1c)	
E	Resistor Grid Complete as shown, for Figs. A and A1. (1-5a, 4-6, 2-7, 6-8, 2-9)	30593
F	Resistor Grid Complete as shown, for Figs. B and B1. (2-5a, 6-6, 2-7, 4-8, 2-9, 2-10)	
G	Resistor Grid Complete as shown, for Figs. C and C1. (3-5a, 8-6, 2-7, 2-8, 2-9, 2-11)	
H	Resistor Grid Complete as shown, for Figs. D and D1. (4-5a, 10-6, 2-7, 2-9, 2-12)	

PLATE N1307

General Railway Signal Company May 1917

Resistor Grids

Drawing references are shown for convenience in checking shipping lists and invoices.

Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
1	Case, includes staple, for padlock fastening..................	
1a	as above, except with cover, hinge pins, hasp and rivets. (1-1, 1-2, 2-3)..	30590
1b	Case only, for screw-lock fastening..............................	30591
1c	as above, except with cover, hinge pins and lock screw. (1-1b, 1-2a, 2-3, 1-4)..................................	
2	Cover, includes hasp and rivets, for padlock fastening.........	
2a	Cover, for screw-lock fastening..................................	30592
3	Hinge Pin, $\frac{5}{16}''$ x $1\frac{3}{4}''$, for covers Figs. 2 and 2a..............	20089
4	Lock Screw, $\frac{5}{16}''$ x $1''$, special, for locking cover..............	21687
5	Grid, includes four studs for terminal posts.................	
5a	as above, except with nuts and washers. (1-5, 12-5b, 10-5c).	30594
5b	Nut, hex., for Fig. 5..	42839
5c	Washer, for Fig. 5..	1225
6	Insulating Washer, for grid Fig. 5..............................	30599
7	Insulating Sleeve, for grid Fig. 5..............................	30597
8	Spacer, for grid Fig. 5...	30598
9	Stud Complete, for supporting grids, includes nuts and washers. (1-9a, 4-9b, 2-9c)..	
9a	Stud, $\frac{5}{16}''$ x $6\frac{1}{2}''$, for Fig. 9..	30596
9b	Nut, $\frac{5}{16}''$ hex., for Fig. 9..	12272
9c	Washer, for Fig. 9..	070
10	Insulating Strap, for resistor grid Fig. F....................	30602
11	Insulating Strap, for resistor grid Fig. G....................	30601
12	Insulating Strap, for resistor grid Fig. H....................	30603

Memoranda

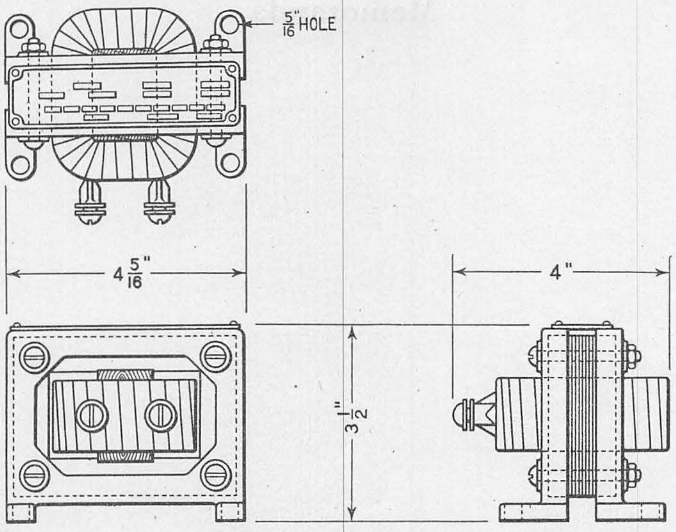
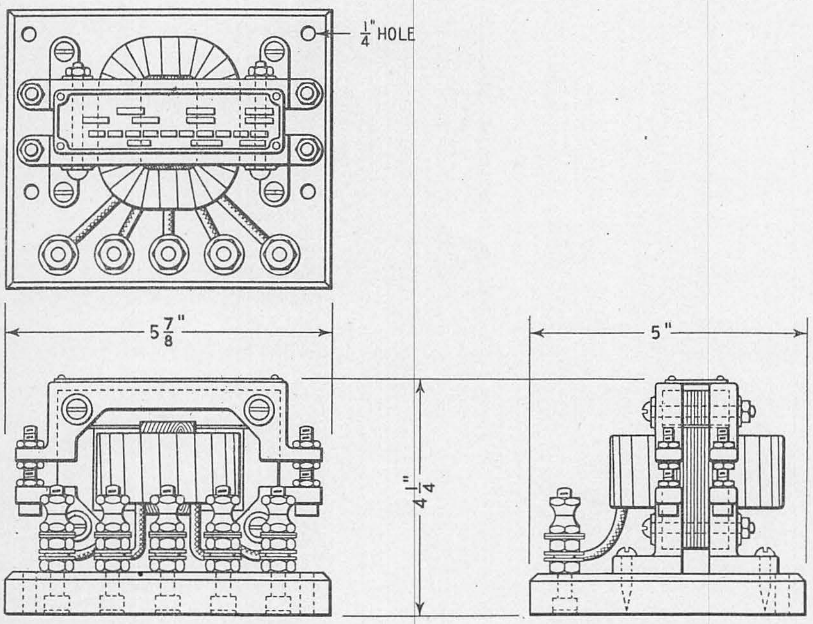

5/16" HOLE
4 5/16"
4"
3 1/2"

FIG. A TO FIG. G INCLUSIVE
NON-ADJUSTABLE LINE REACTORS


1/4" HOLE
5 7/8"
5"
4 1/4"

H - ADJUSTABLE TRACK REACTOR - 25 CYCLES
J - ADJUSTABLE TRACK REACTOR - 60 CYCLES

Non-Adjustable Line Reactors
Adjustable Track Reactors

Non-adjustable Line Reactors

Note: Non-adjustable Line Reactors Fig. A to Fig. G inclusive are for use in series connection with the local phase of the relay thereby giving a better phase displacement between the local and track phases and decreasing the amount of current required by the track circuit. They are for use principally where track circuit conditions are unfavorable, such as long track circuits and poor ballast.

The capacity is limited to 0.050 kv-a. at 60 cycles and 0.025 kv-a. at 25 cycles. If impedance other than those listed is desired, the following information must be given:

1—Frequency of current.

2—Impedance desired.

3—Amount of current reactor must carry.

Adjustable Track Reactors

Note: Adjustable Track Reactors Fig. H and Fig. J are for use on steam road track circuits between the transformer and track to limit the flow of current when the track circuit is occupied. When thus used, a better phase relation is obtained between the currents in the local and track phases of the relay thereby decreasing the amount of current required by the track circuit. These reactors can carry continuously 5 amperes without undue over-heating and double this amount for short periods.

The coil is wound with three taps and the terminal board equipped with five terminal posts as shown, making it possible to vary the impedance over a wide range without changing the air gap. Standard impedances obtainable are as follows:

25 cycles, 0.75—1.50—2.25 and 3.00 ohms.

60 cycles, 1.00—2.00—3.00 and 4.00 ohms.

Further variation from above impedances can be obtained by adjusting the air gap between the two parts of the iron core, by means of adjusting screws provided for that purpose.

When it is desired to duplicate a reactor or when ordering repair parts, always refer to name plate of reactor in question and give drawing number and other data shown thereon.

Continued on following page

PLATE N1311

Non-Adjustable Line Reactors
Adjustable Track Reactors

Order by plate, figure number and name

Non-adjustable Line Reactors

Fig. No.	Frequency	Normal Current	Volts	Impedance	Drawing Reference
A	25	0.06	21	350	42101
B	25	0.25	50	200	42101
C	25	0.41	29.4	72	42101
D	25	0.58	30	52	42101
E	25	1.50	16	10.8	42101
F	60	0.45	56	124	42101
G	60	0.86	31	36	42101

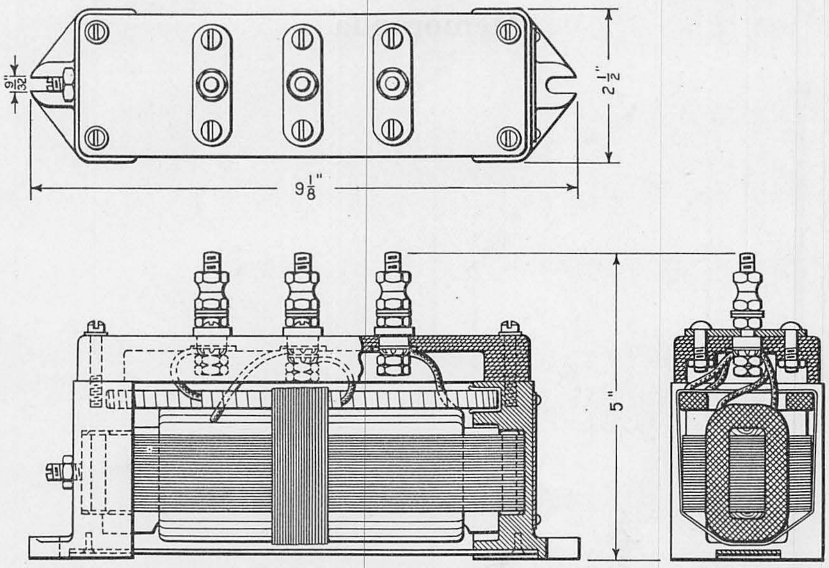
Adjustable Track Reactors

Fig. No.	Frequency	Normal Current	Volts	Impedance	Drawing Reference
H	25	4	12	3	42100
J	60	3	12	4	42100

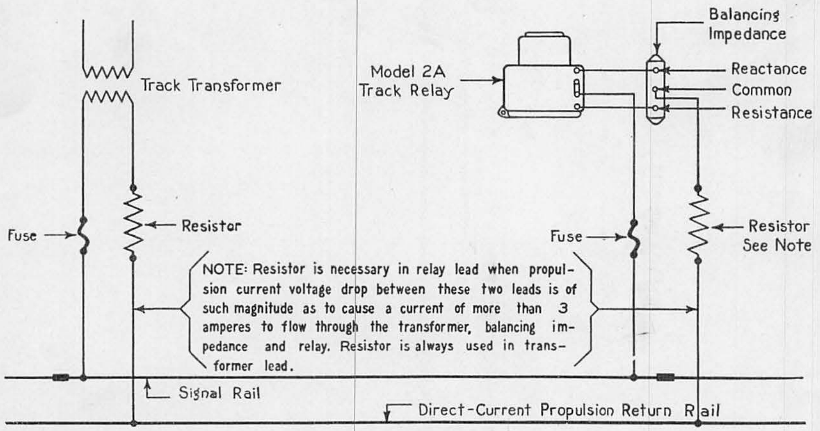
Memoranda

PLATE N1313

General Railway Signal Company March 1928


9"/32
2 1/2"
9 1/8"
5"

A - BALANCING IMPEDANCE COMPLETE


Track Transformer
Model 2A Track Relay
Balancing Impedance
Reactance
Common
Resistance
Fuse
Resistor
Fuse
Resistor See Note
Signal Rail
Direct-Current Propulsion Return Rail

NOTE: Resistor is necessary in relay lead when propulsion current voltage drop between these two leads is of such magnitude as to cause a current of more than 3 amperes to flow through the transformer, balancing impedance and relay. Resistor is always used in transformer lead.

APPLICATION OF BALANCING IMPEDANCE TO TRACK PHASE OF MODEL 2A RELAY WHEN USED ON SINGLE RAIL TRACK CIRCUIT EMPLOYING DIRECT-CURRENT FOR PROPULSION

Balancing Impedance

Balancing Impedance

Note: Balancing Impedance as shown on opposite page is designed for use in connection with Model 2A Relays when used for single rail track circuits on Electric Traction Lines employing direct-current for propulsion. The combination of this balancing impedance and two track windings on the relay neutralizes the magnetic effect due to the direct-current flowing through these track windings.

When the propulsion current voltage drop in a length of rail equal to the length of the track circuit involved, is of such a magnitude as to cause a current of more than 3 amperes to flow through the transformer, balancing impedance and relay, it is necessary to use a resistance unit in series with the track leads at both ends of the track circuit to limit this current. See opposite page for application.

When it is desired to duplicate a balancing impedance or when ordering repair parts, always refer to name plate of impedance in question and give drawing number and other data shown thereon.

Drawing references are shown for convenience in checking shipping lists and invoices.

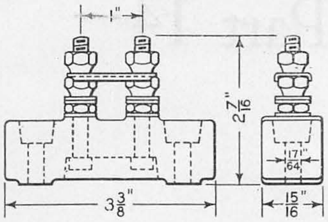
Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
A	Balancing Impedance Complete as shown, 25 or 60 cycle......	42960

Memoranda

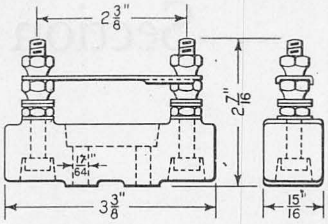
Section N, Part 14

Lightning Arresters
Terminals
Fuses, Etc.

PLATE N1401

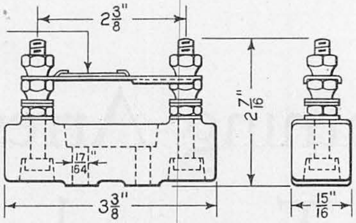

1"
$2\frac{7}{16}$"
$\frac{17}{64}$"
$3\frac{3}{8}$"
$\frac{15}{16}$"

A - TERMINAL BLOCK COMPLETE
R.S.A.

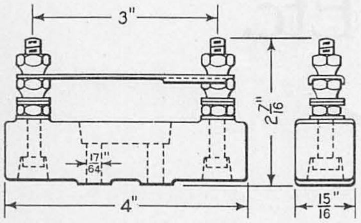

$2\frac{3}{8}$"
$2\frac{7}{16}$"
$\frac{17}{64}$"
$3\frac{3}{8}$"
$\frac{15}{16}$"

B - TERMINAL BLOCK COMPLETE
R.S.A.

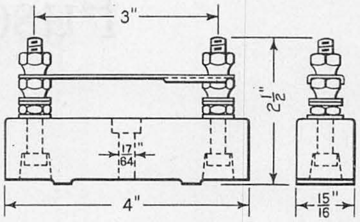
TAG FOR NUMBERING
TERMINAL BLOCKS


$2\frac{3}{8}$"
$2\frac{7}{16}$"
$\frac{17}{64}$"
$3\frac{3}{8}$"
$\frac{15}{16}$"

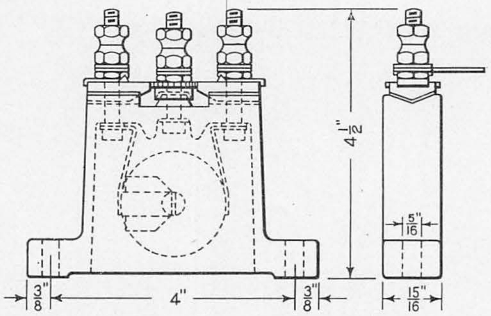
C - TERMINAL BLOCK COMPLETE
R.S.A.


3"
$2\frac{7}{16}$"
$\frac{17}{64}$"
4"
$\frac{15}{16}$"

D - TERMINAL BLOCK COMPLETE


3"
$2\frac{1}{2}$"
$\frac{17}{64}$"
4"
$\frac{15}{16}$"

E - TERMINAL BLOCK COMPLETE


$4\frac{1}{2}$"
$\frac{5}{16}$"
$\frac{3}{8}$"
4"
$\frac{3}{8}$"
$\frac{15}{16}$"

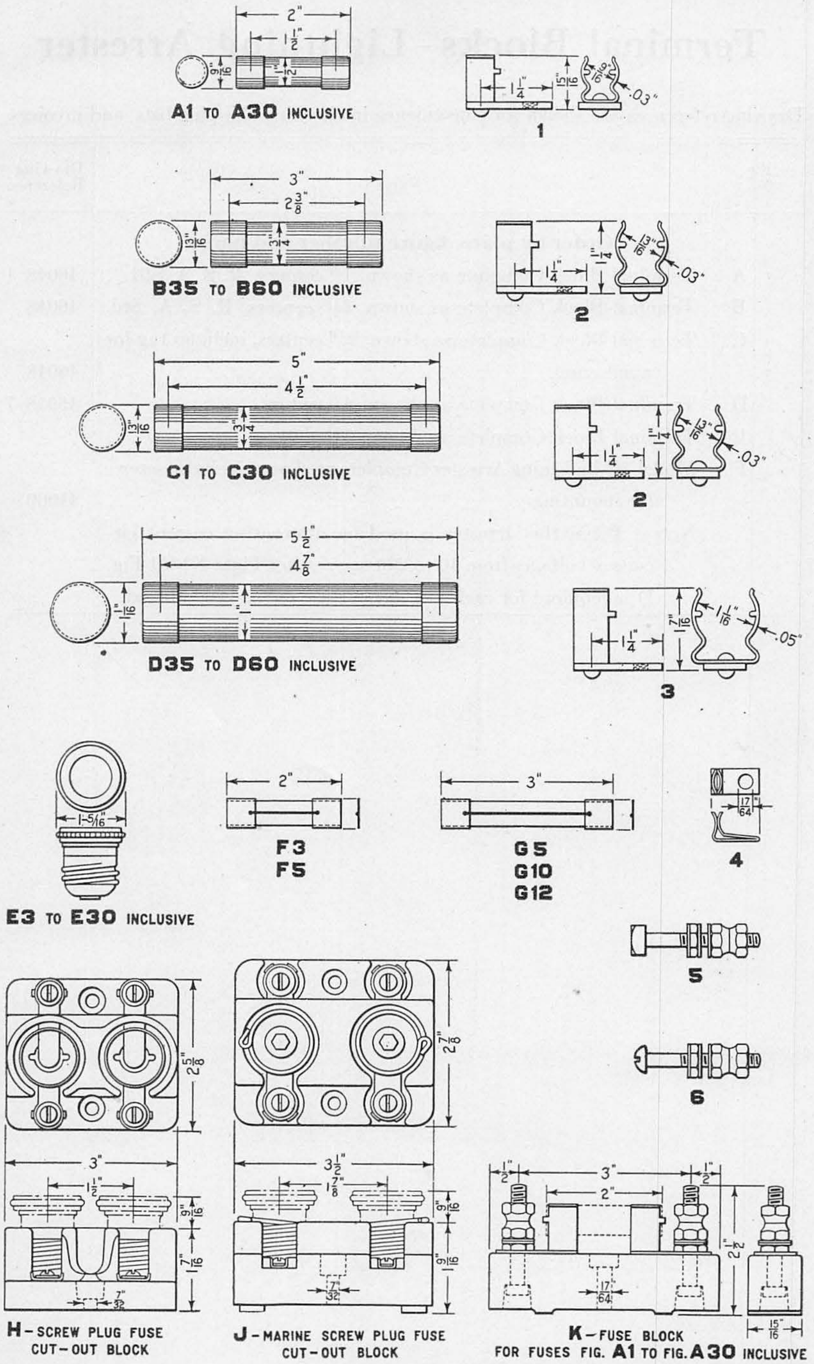
F - MODEL 1B LIGHTNING ARRESTER COMPLETE

Terminal Blocks—Lightning Arrester

Terminal Blocks—Lightning Arrester

Drawing references are shown for convenience in checking shipping lists and invoices.

Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
A	Terminal Block Complete as shown, 1″ centers, R. S. A. Std.	46048
B	Terminal Block Complete as shown, $2\frac{3}{8}''$ centers, R. S. A. Std.	46048
C	Terminal Block Complete as shown, $2\frac{3}{8}''$ centers, includes tag for numbering	46048
D	Terminal Block Complete as shown, 3″ centers	46048–1
E	Terminal Block Complete as shown, 3″ centers	
F	Model 1B Lightning Arrester Complete as shown, includes screws for mounting	41900
	Note: When this arrester is used on alternating current circuits of voltages from 40 to 220 one resistor Plate N1301 Fig. D is required for each arrester, for use in the ground lead.	


2"
1½"
9/16"
1/2"
15/16"
1¼"
13/16"
.03"
3"
2⅜"
13/16"
3/4"
1"
1¼"
.03"
5"
4½"
13/16"
3/4"
1"
1¼"
.03"
5½"
4⅞"
1 1/16"
1"
7/16"
1¼"
.05"
1-5/16"
2"
3"
17/64"
2⅝"
2⅞"
3"
1½"
9/16"
7/16"
7/32"
3½"
1⅞"
9/16"
9/16"
7/32"
1/2"
3"
2"
1/2"
2½"
17/64"
15/16"

A1 TO A30 INCLUSIVE

1

B35 TO B60 INCLUSIVE

2

C1 TO C30 INCLUSIVE

2

D35 TO D60 INCLUSIVE

3

E3 TO E30 INCLUSIVE

F3
F5

G5
G10
G12

4

5

6

H-SCREW PLUG FUSE CUT-OUT BLOCK

J-MARINE SCREW PLUG FUSE CUT-OUT BLOCK

K-FUSE BLOCK FOR FUSES FIG. A1 TO FIG. A30 INCLUSIVE

Fuses, Fuse Clips, Fuse Blocks, Etc.

Fuses, Fuse Clips, Fuse Blocks, Etc.

Note: Fuses Figs. A 1 to D 60 inclusive are fitted with indicators that show when the fuse is blown and plug fuses Figs. E 3 to E 30 inclusive are fitted with a mica window that allows inspection of the fuse wire.

Order by plate, figure number and name

Enclosed Fuses—Ferrule Contact Type
(National Electric Code Standard)

For Potentials not exceeding 250 volts				For Potentials not exceeding 600 volts			
Fig. No.	Amperes	Fig. No.	Amperes	Fig. No.	Amperes	Fig. No.	Amperes
A 1	1	**A 15**	15	**C 1**	1	**C 15**	15
A 2	2	**A 20**	20	**C 2**	2	**C 20**	20
A 3	3	**A 25**	25	**C 3**	3	**C 25**	25
A 4	4	**A 30**	30	**C 4**	4	**C 30**	30
A 5	5	**B 35**	35	**C 5**	5	**D 35**	35
A 6	6	**B 40**	40	**C 6**	6	**D 40**	40
A 7	7	**B 45**	45	**C 7**	7	**D 45**	45
A 8	8	**B 50**	50	**C 8**	8	**D 50**	50
A 9	9	**B 55**	55	**C 9**	9	**D 55**	55
A 10	10	**B 60**	60	**C 10**	10	**D 60**	60
A 12	12			**C 12**	12		

Plug Fuses—(National Electric Code Standard)

For Potentials not exceeding 125 volts							
Fig. No.	Amperes	Fig. No.	Amperes	Fig. No.	Amperes	Fig. No.	Amperes
E 3	3	**E 10**	10	**E 15**	15	**E 25**	25
E 6	6	**E 12**	12	**E 20**	20	**E 30**	30

Continued on following page

PLATE N1403

Fuses, Fuse Clips, Fuse Blocks, Etc.

Fuses—Mica protected

For Potentials not exceeding 250 volts

Fig. No.	Amperes	Fig. No.	Amperes	Fig. No.	Amperes
F 3	3	G 5	5	G 12	12
F 5	5	G 10	10		

Drawing references are shown for convenience in checking shipping lists and invoices.

Fig. No.	Name	Drawing Reference
	Order by plate, figure number and name	
H	Screw Plug Fuse Cut-out Block Complete as shown, for mounting plug fuses Figs. E 3 to E 30 inclusive. Does not include fuse plug which must be ordered separately if desired....	40562
J	Marine Screw Plug Fuse Cut-out Block Complete as shown, for mounting plug fuses Figs. E 3 to E 30 inclusive. Does not include fuse plug which must be ordered separately if desired..	43548
K	Fuse Block Complete as shown, for mounting fuses Figs. A 1 to A 30 inclusive. Does not include fuse which must be ordered separately if desired...........................	50037
1	Fuse Clip, for mounting fuses Figs. A 1 to A 30 inclusive.....	30776
2	Fuse Clip, for mounting fuses Figs. B 35 to C 30 inclusive......	40561
3	Fuse Clip, for mounting fuses Figs. D 35 to D 60 inclusive......	
4	Fuse Clip, for mounting fuses Figs. F 3 to G 12 inclusive......	16145
5	Binding Post Complete as shown, includes screw, nuts and washers, R. S. A. Std. (1-5a, 2-6b, 3-6c, 1-6d)..........	
5a	Screw, sq. hd., for Fig. 5..................................	45709
6	Binding Post Complete as shown, includes screws, nuts and washers. (1-6a, 2-6b, 3-6c, 1-6d)......................	
6a	Screw, rd. hd., for Fig. 6..................................	48561
6b	Binding Nut, hex., for Figs. 5 and 6........................	42843
6c	Washer, for Figs. 5 and 6..................................	1225
6d	Base Nut, for Figs. 5 and 6..................................	46989